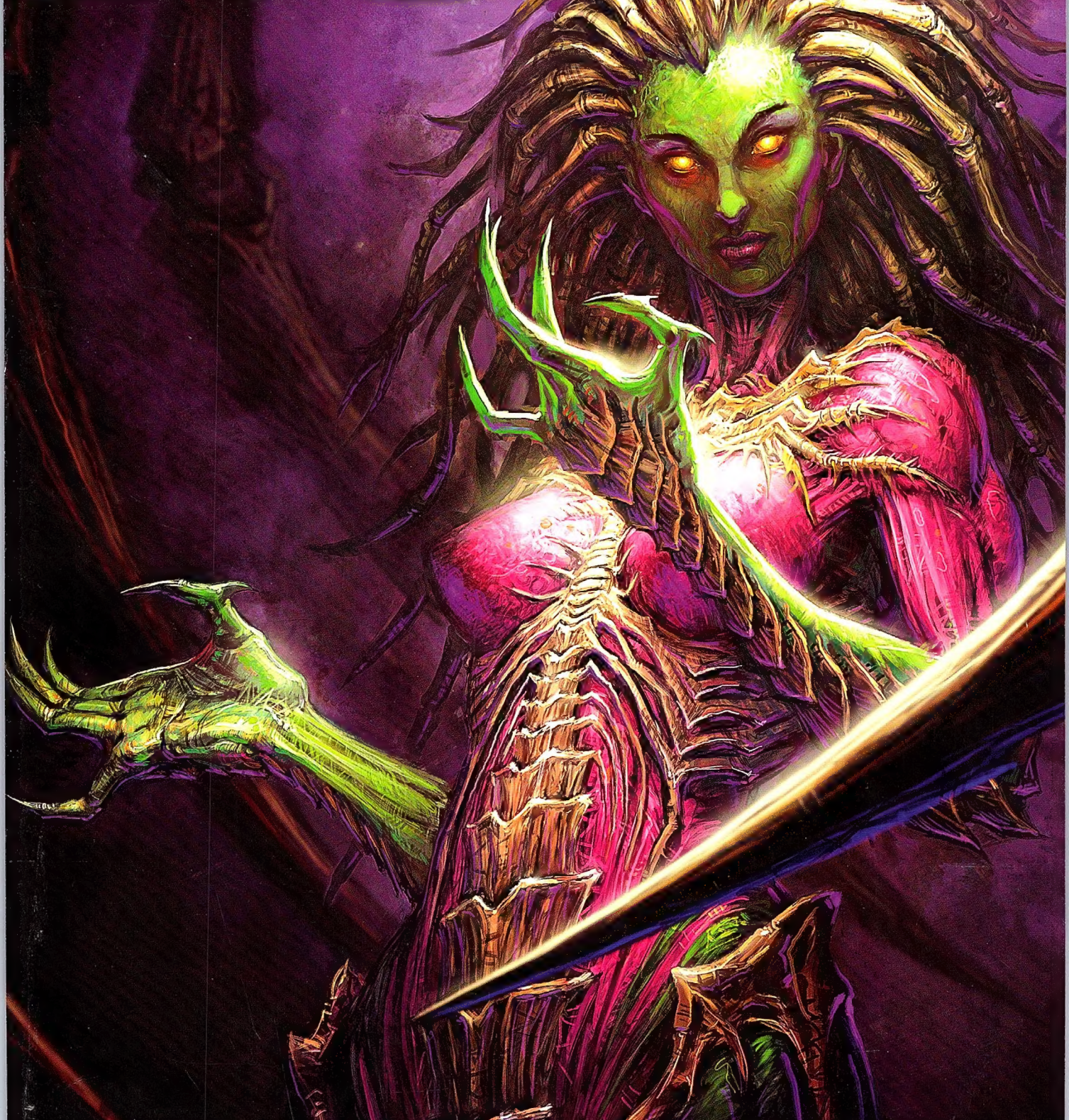


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EDHEAD

We've seen everything...

This issue we launch the first Atomican's Choice Awards, and it's been an interesting road to the final list of winners and top brand and hardware you'll find later in this issue.

First up was the... not-as-thrilling-as-we-might-have-liked sorting of the data. In some cases, this was pretty easy, but for most... whoa. The main culprit that made this such a challenging process was the complexity that many companies exhibit in their branding. The profusion of seemingly random letters, numbers and even made up words in a lot of product-names can be confusing at the best of times, but when you're going through a list of a few thousand PC parts trying to sort out whether a

particular reader means an ancient 5800 video card or a newer 5870, it's even worse.

On top of that, you've got general confusion of the people filling out the survey themselves. I love you all, very dearly, but when we ask you what's in your PC, a response of "Don't know, not at home" is less than useful. Perhaps, I don't know... YOU COULD WAIT AND CHECK WHEN YOU GET HOME?!

And just don't get me started on the guy who didn't know how to take the side of his case off.

We also had a number of Nvidia-brand ATI cards, a mess of notebooks (even though we asked for desktops specifically), and an awful lot of people answering 'generic' for everything from mouse to CPU.

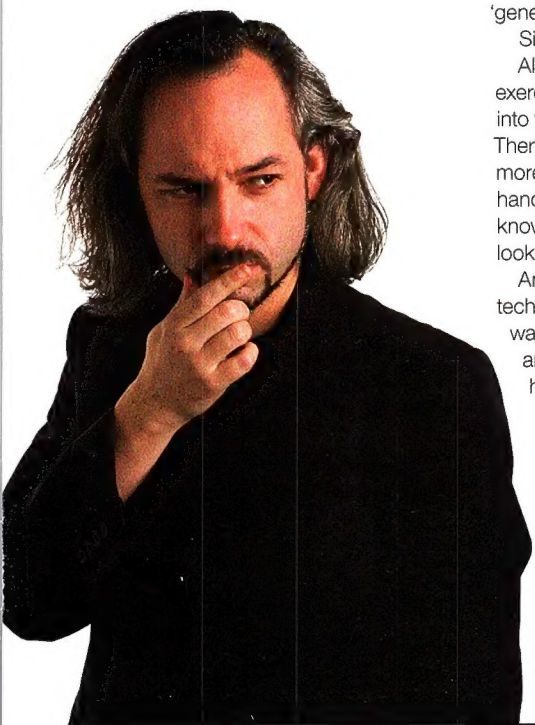
Sigh. But that's the human factor for you.

All that aside, it was an interesting exercise because it also gave us an insight into the breadth of tech that Atomicans use. There's a lot of Apple systems, and even more server-grade gear – no doubt in the handful of server-grade storage setups I know a few Atomicans have. And yes, I'm looking at you, Felipe!

And there was some wonderfully old tech still in use, too, stuff that goes all the way back to the first issue of Atomic and beyond. No doubt these are now hand-me-down machines, or simply being used as file servers or similar, while people keep the newer tech for mainline use. At least we hope so...

But, more importantly, I feel I know the 'average Atomican' much better now. And that's never a bad thing.

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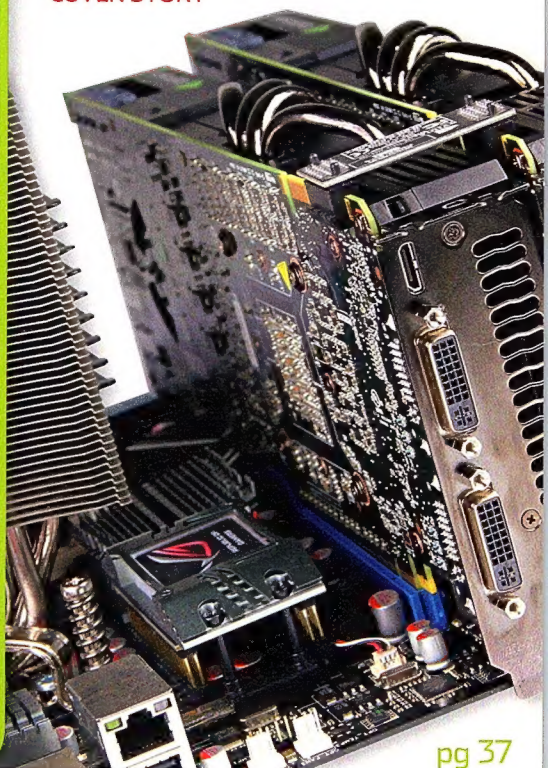
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Battlefield Bad Company 2 gets major updates

New server browser, new balancing, and a whole new experience for Bad Company 2 fans.



We weren't entirely impressed with the launch of Battlefield Bad Company 2. There were a host of issues with the game that essentially - in our opinion - added up to a game that was seriously undercooked at launch. Our original whinge (www.atomicmpc.com.au/?169683) drove quite a bit of discussion, so we feel bound to report on Bad Company 2's recent updates.

In short - it's a whole new game.

The R7 client patch and the R10 server update have re-balanced a swathe of weapons and gear, and also given a thorough face-lift to the game's multiplayer server browser. We also suspect some tweaks to the graphics have been made, because little things like tearing water textures seem to have disappeared entirely.

The server browser changes in particular are a Gods-send. The browser is now much faster and responsive, allowing you to search out games by mode, Hardcore setting and region in moments. The days of endless refreshes and not being able to find a local server are long past, and we're pleased to be able to report many dozens of local servers to choose from.

It all adds up to a sense of real rediscovery. If this were the state of the game at launch, the Atomic review would have been an entirely different beast - Bad Company 2 would have gotten at least a Hot Award, if not a score approaching 100.

So, credit where credit is due: bravo to EA and DICE.

Sony to give away free 3D games

3D PS3 games will come free with televisions.

Sony will bundle free 3D stereoscopic game titles for its Playstation 3 with all of its 3D televisions.

The firm expects to get its 3D goggles into stores by June and hopes that by tempting in floating shoppers with offers of free treats, it will "reconfirm its position at the forefront of digital television".

Usually, when something is a success you don't have to give it away, but whatever, Sony will throw free games at shoppers who buy any of its sets, and exclusive 3D blu-ray disks at people who buy selected televisions and players.

Depending on how well the games live up to their pedigrees this could prove to be a wise move for

Sony, and the downfall for anyone who struggles with sensibly managing their money.

One of the games mentioned as a 3D title is Wipeout, the space age racer that sold like hot spacecakes on the PSone. Our only response to this is... ZOMG. Wipeout in 3D would be about the closest you could get to tripping without dropping the blotter acid.

PS3 owners will have to take on another Sony firmware upgrade, and we know how those pan out.

Anyone whose PS3 is still working after the last firmware update should prepare for the next, which Sony said will happen before the televisions hit the shelves.



FROM ATOMIC
ONLINE

This month for POTM we look once more to the rolling fields of GamingVille, and reflect upon the trees, crates, walls and other random items that provide life-giving cover in games of all types. If you haven't guess it, our winner is...

Bundy! For his excellent treatise on cover in games!
<http://forums.atomicmpc.com.au/index.php?showtopic=29941>

Well done, old bean! But he's not alone in the awesome stakes! This month we give big ups and giant kudos to...

Leonid, for getting his groove on regarding research, rhetoric, refugees and journalistic integrity.
<http://forums.atomicmpc.com.au/index.php?showtopic=30171&st=0&p=606457&entry606457>

Alien Intercourse gets into the product lifecycle.
<http://forums.atomicmpc.com.au/index.php?showtopic=30237>

And, finally, we want to seriously thank everyone in Nightbabe's thread for reminding us just how awesome the Atomic community can be.
<http://forums.atomicmpc.com.au/index.php?showtopic=30543>



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1. Belkin Home Base network USB hub

Price: \$199.95 **Website:** www.belkin.com/au

The job of amateur home network admin is an often thankless one. Whether you're an expert at Big Iron systems or a true novice, network in the home provides... unique challenges. Trip-proofing cable runs, protecting important infrastructure from cat wee, not to mention fire!

Another layer of complexity is space – how do you get everything you want connected, without festooning the house in layers of Cat-5? This USB hub from Belkin, with wireless connectivity, could well be the answer to your prayers. It can share printers and other peripherals, access media via net-connected consoles and televisions, and more.

2. HTC Desire

Price: \$779 **Website:** www.htc.com

We're not immune to the allure of a sexy smartphone here at Atomic HQ, and while some folks might fall firmly on the side of Apple's monolithically popular iPhone, we can still see why other folks think the new HTC Desire is sexy in its own right.

It's like "Google's Nexus One," says our Deputy, Justin Robinson, "but more awesome." And who are we to argue? It's a slick unit with a great screen, a mess of pre-installed applications, and it features Flash-based web browsing – hear that Apple?! You can buy the phone outright, or go the Plan route with options from the big suppliers.

3. Targus 'Unofficial' Laptop Messenger bag

Price: from \$54.95 **Website:** www.targus.com.au

Bags. Not only are they really good for carrying your shit around in, they can also be a fashion statement. And we don't just mean handbags or shiny Louis Vitton man-bags, either. The humble satchel or messenger can be just as powerful a statement of intent.

Think of Jack Bauer. His shoulder bag is the tool of a man ready for anything – and it keeps his flashbangs, ammunition and handy little mag-scope safe from harm. This new messenger bag from Targus has a similar function-set, and... well... we also like it because the olive green version has the same metallic sheen as the Master Chief's MJOLNIR armour. We're not proud of that, mind...

4. Moshi Bassburger

Price: \$49 **Website:** www.lomis.com.au

We kinda dig these little speakers – they're like a little magical musical mushroom that can output a surprising amount of noise for something that is essentially no lighter than a few bits of plastic and paper.

What's more, the Bassburger is easy to carry around: in a pocket, bag or on a keychain if you're really keen. They work off a rechargeable lithium battery, and can pump out the noise for up to eight hours. Perfect for MP3 players, mobile phones, or even portable game consoles. And it sounds delectable.

5. Benq DVM1 camcorder

Price: \$399 **Website:** www.benq.com.au

There's something to be said about having a tiny video recorder you can carry around with you. You never have one when you're going to see something worthy of taking down for posterity: a beautiful sunset... a great time with a few mates... or your best friend passed out on the bathroom floor and hugging the toilet.

And the new DVM1 is perfect for recording all of these. It's packed with features, including a dual display, auto-record options, HDMI output and an electronic image stabiliser, and is a snazzy unit to boot. It uses either a 4GB SD card or a 32GB SDHC card – plenty of room for capturing all those timelessly embarrassing moments!

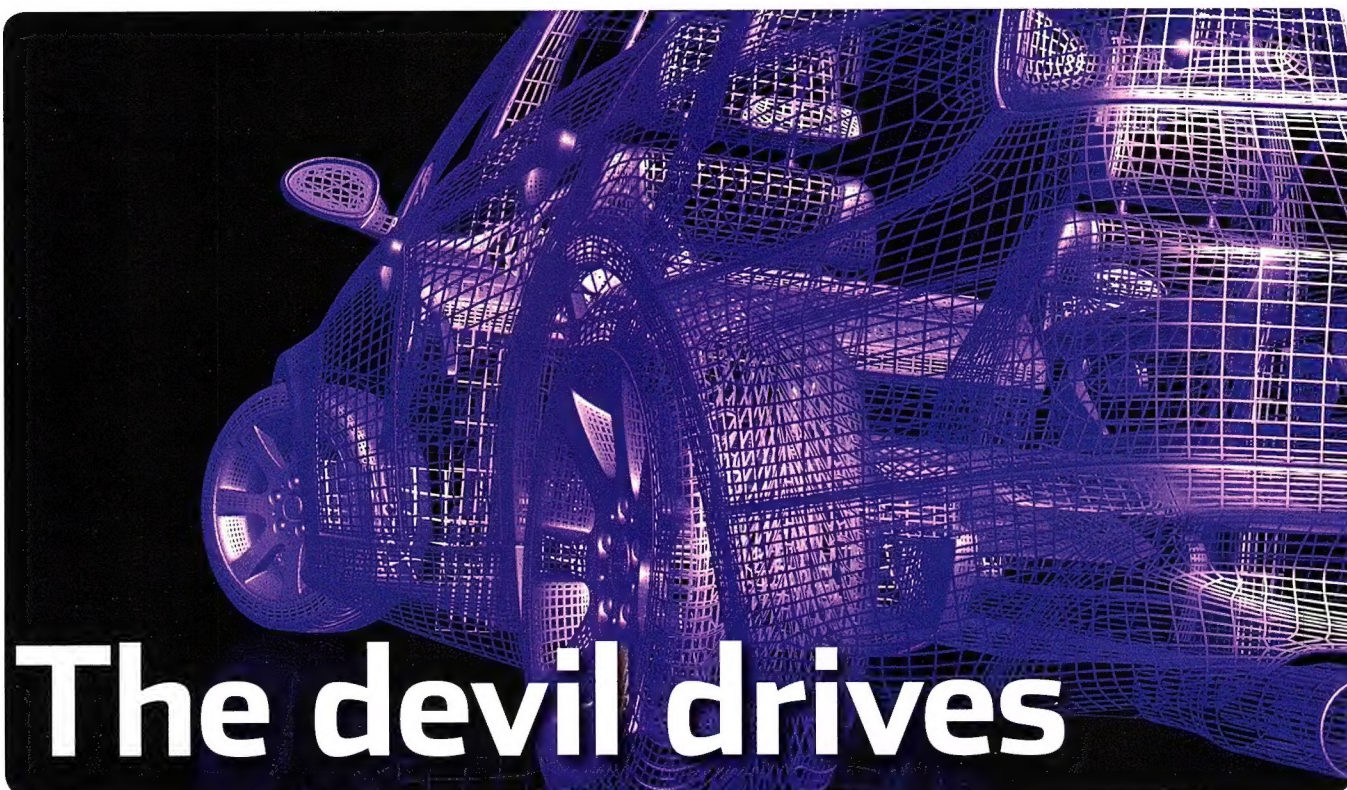
6. Jayne's Troublemaker t-shirt

Price: \$US26.95 **Website:** www.quantummechanix.com

He's the Hero of Canton; he can never get enough grenades; he loves his mother, and his rifle (in that order, roughly). He's Jayne Cobb, muscle aboard the freighter Serenity, and he's also one hell of a clothes horse.

If you want to feel closer to Jayne's awesomeness then this authentic replica t-shirt from film Serenity is your way to being the hero of your own local mud-mining town!

I'll be in my bunk.



The devil drives

Jake Carroll goes into rev-head mode.

Remember when your crazy Tasmanian mate Iain turned up on your doorstep uttering incoherent noises while attempting to explain that he'd just installed a Core i7 box in his car? Remember the silence that fell over the entire room when nobody was all that impressed, much less even make sense of why he'd done this? Well, don't stress. X-Ray isn't about installing a rig in your car this month. It's actually about the computers that *control* modern cars.

Modern cars are pretty much combustion engines (and sometimes hybrid electric/combustion!) controlled via a bit of silicon telling things to happen, and when it should happen. Sounds pretty simple on the surface, but when you consider the relative complexity of a vehicle these days, it's a pretty non-trivial ballet on wheels. Back when the Model T Ford first rolled off the production line, few could ever anticipate the collection of technologies that would ultimately form the driving experience we know today (and yet, in stark contrast, we're still burning ancient fossils as fuel).

All the little systems

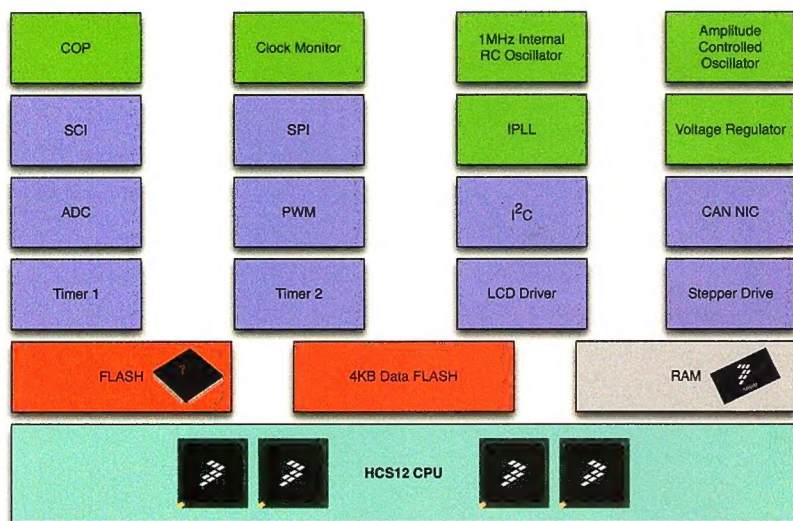
There are just too many aspects of car computer control systems to understand head-on. We'll break it down into simple systems and then more complex/cutting edge components.

Computers can control everything from the volume of fuel, ignition timing, launch stabilisation, gaseous pressure control, emissions volume and many other aspects of a combustion

engine. The way these computers obtain their information is through reading the values of sensors and active feedback mechanisms inside the engine/drive train, wheels and car body that form multidimensional performance maps (in computer science, we'd call it a three dimensional array or look up table [LUT]).

Small steps

The most basic functions are taken care of by an Engine Control Unit (ECU), and those found on almost every modern car are by and large pretty mundane. Fuel/air mixture, idle speed and ignition timing aren't really all that glamorous. It's only when we come to controls such as variable



A Controller Area Network micro controller designed to control the dash board, climate control, steering wheel cluster and in car head up display. Flicking through that 6 stack CD player full of Miley Cyrus and changing the temperature control zones in the back of the car has never been so easy!



The Toyota Prius dash, powered by several Freescale Semiconductor control units.

valve timing and electronic valve control that things start to get interesting. In certain vehicles, a technology known as VVT or Variable Valve Timing exists, allowing the ECU to control the exact time in the engine cycle at which the valves open for fuel and exhaust ports. The valves often open sooner at higher speeds, and later at lower speeds. The net effect is optimisation of the amount of fuel air mixture used at different performance envelopes, and as a result, this gives better economy.

Not so Intel inside

Beyond this, things get complicated and require a bit more in depth processor technology under the hood. Here, we refer to things such as drive train (power train), safety/chassis and body computing systems. Many of these technologies already exist in consumer grade production vehicles, but some aspects of these are reserved for luxury vehicles, sports cars and prestige/concept cars.

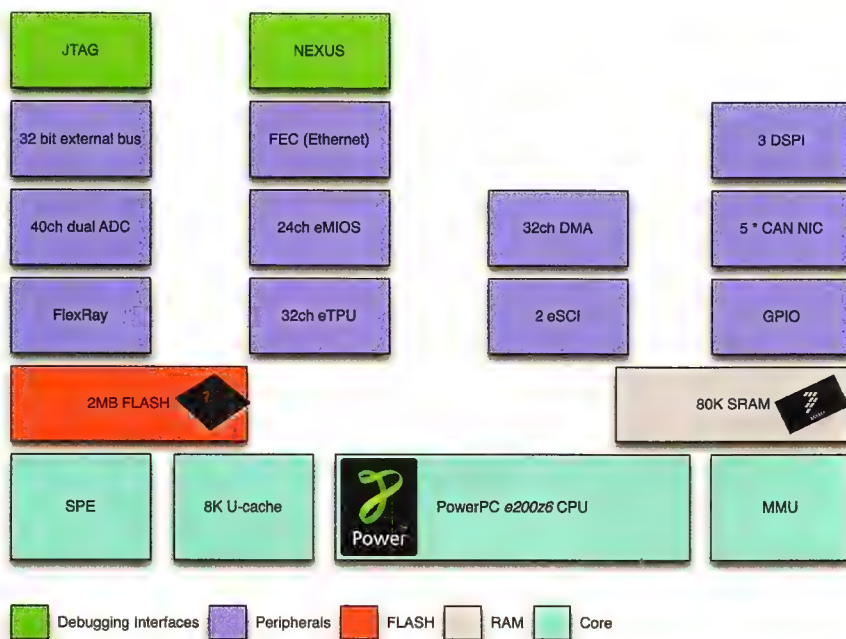
There are cars now on our roads, in limited numbers, that don't have a camshaft. Instead, full electronic control is handed over to a computer, to control the opening and closing of fuel intake and exhaust valves. Because of the precision and the nanosecond timings permitted by using a robust and heavily engineered ECU, it's actually possible to run such an engine in a 'static-start' scenario. It doesn't need a starter motor to turn over.

The technology that makes the finer stuff possible is a little alien compared to what you'd find in a LAN rig or something sitting under your desk in the office. The CPUs are often unusual hybrid hardware, running custom architecture (SPARC, x86 and PowerPC). The most common microcontroller used in vehicle computing is the hardware produced by Freescale Semiconductor. The Freescale S12, S12X and S12HY are 16 bit controllers, capable of significant processing, intelligence and decision-making.

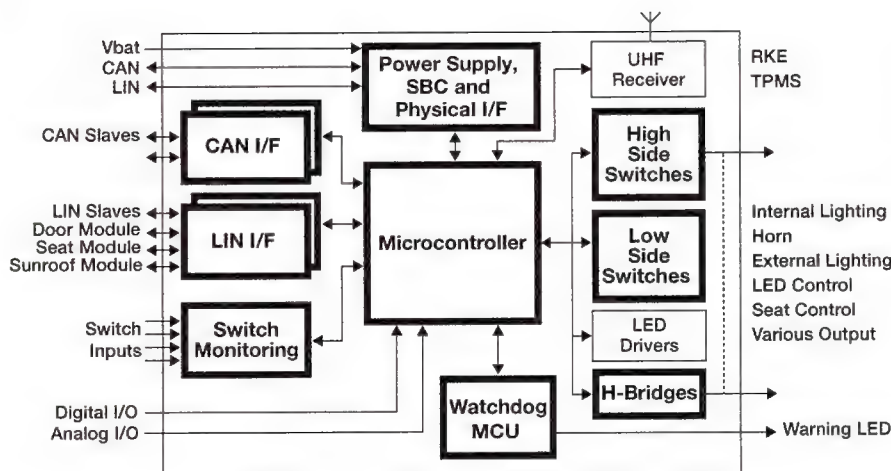
Yes we CAN (keep everyone talking and moving).

The way processors like the Freescale S12 series control the vehicle is through what is known as a Controller Area Network or CAN. Throughout the network across the vehicle, sensors feed back information from all sections over what might be considered a primitive form of TCP/IP.

The CAN is an asynchronous serial bus network, generally speaking. The quasi-TCP like stack was invented by Robert Bosch GmbH in 1986 and was designed purely for automotive applications requiring data signaling rates of 1Mbps and lossless transfers. There are certain protocols and procedures in place that separate sets of these controller systems from each other. The reason for this is one of contingency, safety



The business end of town, at the engine fuel, timing control and power train level, the MPC5567 based upon PowerPC processor architecture. This design is still intimately linked over a private CAN to the rest of the components around the vehicle, such as the HCS12, powering and displaying information to the driver at the dashboard.



The simple things in life that keep the car useful. Horns, door switches, electric windows and warning bells are all controlled through a discrete CAN enabled microcontroller.

and security. Imagine for a moment your car navigation system crashing, but in the process, causing your transmission and braking system to crash in sympathy. For this reason, the components are segregated.

- * Variable Camshaft position mapping.
- * Knock detection.
- * Engine rev limiter.
- * Closed loop boost control.
- * Launch control.

Slip can be determined by calculating the ratio of wheel speed to the vehicle speed.

Power train control is the first layer of isolation, being handled predominantly by dedicated 32bit PowerPC processors such as the e200z6 clocked at 132MHz.

The power train has very different inputs from something you'd normally find controlling the dash. For a start, there are dedicated algorithmic logic units (ALU) and math co-processors, full cache like you'd expect in a CPU inside an everyday rig and a number of network interfaces. Engine control more closely resembles what a traditional computer as we know and interact with feels like/looks like architecturally because it has all the same types of inputs and outputs that we would notionally require. Interestingly, even though we interact directly with things such as heads up displays, fuel gauges, in-car navigation and touch-sensitive panels, the logic and technology like those shown in the HCS12 in the previous figure is very primitive in comparison to engine/power train management, despite giving the impression of intelligence and complexity.

Engine management in itself has a lot of inputs. Much more than most end users assume is the case. In the case of a modern vehicle such as the Toyota Prius or Nissan's GT-R (R35), many of the inputs are complex, multi dimensional parameters. As an example, an exhaustive list of the functions an R35 Nissan GT-R feeds to its ECU are:

- * Sequential fuel control.
- * Direct Fire Ignition control.

- * Closed loop wideband O2 control.
- * Onboard data logging control.
- * Speed density, MAF tuning.
- * Throttle position sensitivity.
- * Mass airflow
- * Battery condition.
- * Temperatures (global).
- * Crank speed.
- * Clutch/break position.
- * Global vehicle speed.

Other tasks involve keeping everyone comfortable and illuminated. Totally separate systems exist for body temperature control and lighting in many modern vehicles. The same applies for door monitoring, seat belt lights and sensors, as well as sunroof, horn control et al.

Keeping everyone safe and not wrapped around a tree

Safety systems and the parts that keep all four tires doing what they should on our roads have become increasingly complex in the last decade. This means the computers that control stability

systems, traction control, launch stabilisation, wheel synchronisation, breaking systems and proximity detection are as complex as those sitting on our laps and desktops in some respects. Anti-Lock Braking Systems (ABS) are designed to maintain complete driver control and stability of the car during serious or emergency braking. The thing about locked up wheels is that they will slow a car down, but not let the driver steer out of harms way, if need be. ABS systems inside vehicle computers have discrete wheel sensors connected to the CAN, which monitor for slippage. Slip can be determined by calculating the ratio of wheel speed to the vehicle speed, which is continuously calculated for the four individual wheel speeds. During a braking event, the function of the control system is to maintain maximum possible wheel grip on the road without the wheel locking. This is (physically) achieved by adjusting the hydraulic fluid pressure to each break by way of a computer controlled solenoid valve.

This all goes one step further when it comes to vehicle stability and traction control systems, which are some of the most complex real time sensing systems available today. Electronic Stability Control, or ESC, builds upon many of the concepts we've already seen and adds extra sensors, such as a yaw rate sensor. This is a gyroscopic device that measures angular velocity around a vertical axis. The output of the device is usually in degrees per second. Interestingly, measurements of this nature that compare the



The Nissan R35 (GT-R) ECU, now exploited, enabling an additional 131km/h of top end speed, regardless of the location. The GT-R is known for its ability to globally sense the proximity to dedicated race tracks, being the only places it would allow 'top speed' mode to run.

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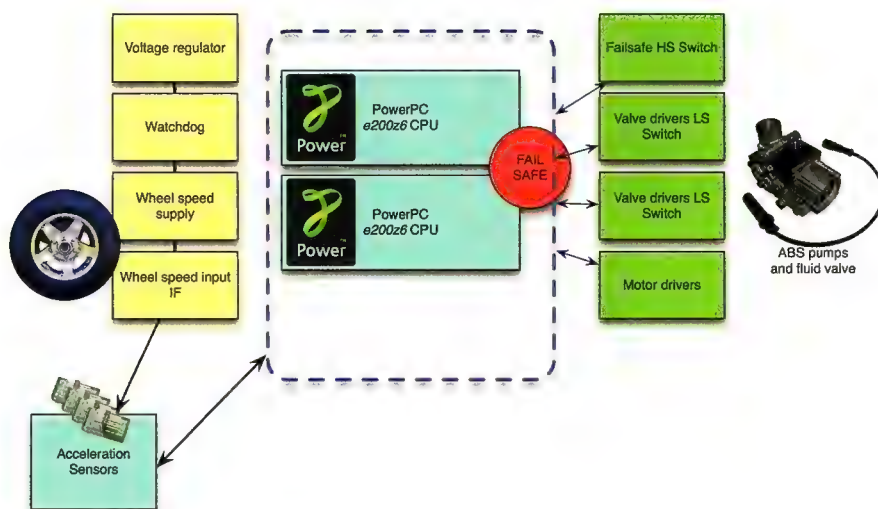
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TOMORROW'S TECHNOLOGIES TODAY!



The complex dance that is ABS, shown here with acceleration sensors interacting with a dual core redundant processor, allowing trim gates and computer controlled solenoids to balance and change fluid levels inside an ABS pump system.

vehicle heading angle to the vehicle actual movement direction are called the slip angle, and are based upon the Coriolis effect, made famous in popular culture through the Simpsons noticing water flowing down the toilet in a different direction in the southern hemisphere.

Proprietary control and the open source hippy kids

For a long time, there has been a struggle between the car manufacturers and end

dedicated DIY EFI engineers out there. No, not Extensible Firmware Interface. Electronic Fuel Injection. Open source engine management has become a big topic, with many back yard racers, enthusiasts and specialist engineering groups choosing to go down this path (like <http://www.diyefi.org/>).

Most of the code running on these units is PPC arch (PowerPC, just like the Apple Mac's of yesteryear) and is quite close to machine level. A lot of the code developed for engine management is encased in the FreeEMS firmware bundles made available for end users on sourceforge.net.

Some of the largest issues that exist in FBW and ECU-based control come from questions of redundancy and failsafe mechanisms...

users/enthusiasts concerning the control and engineering of the ECUs that take care of most engine management functions. Rather than employing 'buy in' tactics that companies such as Gigabyte and Asus do with motherboards specifically designed to unlock extra cores and unlock multipliers to gain extra performance for free, the vehicle vendors actively attempt to prevent end user modifications. Granted, the relative costs are higher if something goes hideously wrong with an engine ECU versus a motherboard BIOS becoming unstable.

Regardless, companies continue to invent new and difficult protection schemes to keep their ECU code safe. Nissan's R35 (GT-R) was said to be uncrackable until early 2009 when the custom tuning company Cobb Tuning announced they had manually flashed their own control code onto a Nissan ECU.

Hacking ECUs is one thing, but there is a growing movement and work group of

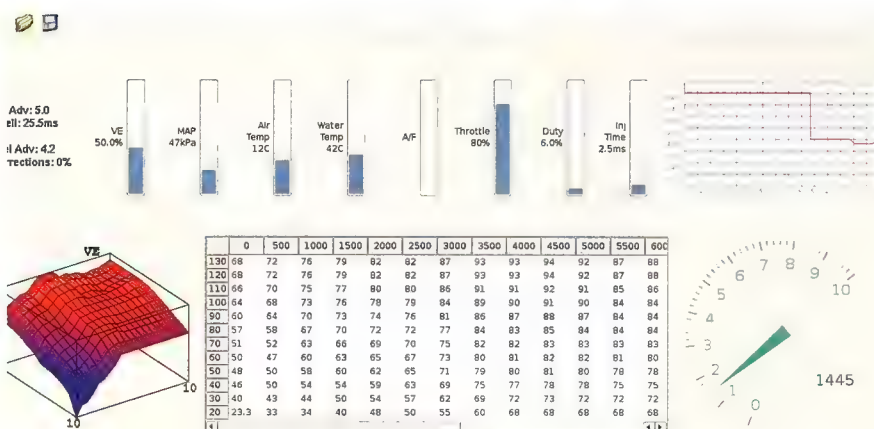
Many enthusiasts have now taken responsibility for their own ECUs and actively contribute code, tweak, tune and effectively overclock engines at a very low level. The problem is, the impact that slight miscalculations or multiple variable changes might have upon engine safety, performance and stability. For this reason, it's not a hobby for the weak of mind or faint of heart.

Fly by wire

For many years now, the avionics concept of 'fly by wire' (FBW) has been used. This has now filtered through to cars. The problem with mechanical and hydro-mechanical systems is that they are heavy, and require careful routing of control cables using pulleys, cranks, tension cable and hydraulic pipes. An FBW system, in comparison, uses an electronic interface, oftentimes coupled by redundant wireless and wired telemetry paths in a CAN.

There are issues that arise from the use of pervasive computing and automation in vehicular systems, such as CANs and FBW, whether they be in planes, trains, cars, hovercraft or otherwise. Some of the largest issues that exist in FBW and ECU-based control come from questions of redundancy, failsafe mechanisms and fall back signals. Interestingly, many of the systems such as those discussed earlier in this article have complete fail safe mechanisms, but are extremely conservative in their approaches. Ever wonder why you'll so often see a luxury vehicle parked on the side of a road with a grief stricken driver dialing for help, at a complete loss of understanding as to what's going wrong? The car looks fine from all outward accounts. The engine management and telemetry might not be however. Next time you step into your car or hop on a plane, think about all the times you've watched your system fall over in a heap just before loading a level in Modern Warfare 2.

Just don't drive without a mouse and some spare RAM!

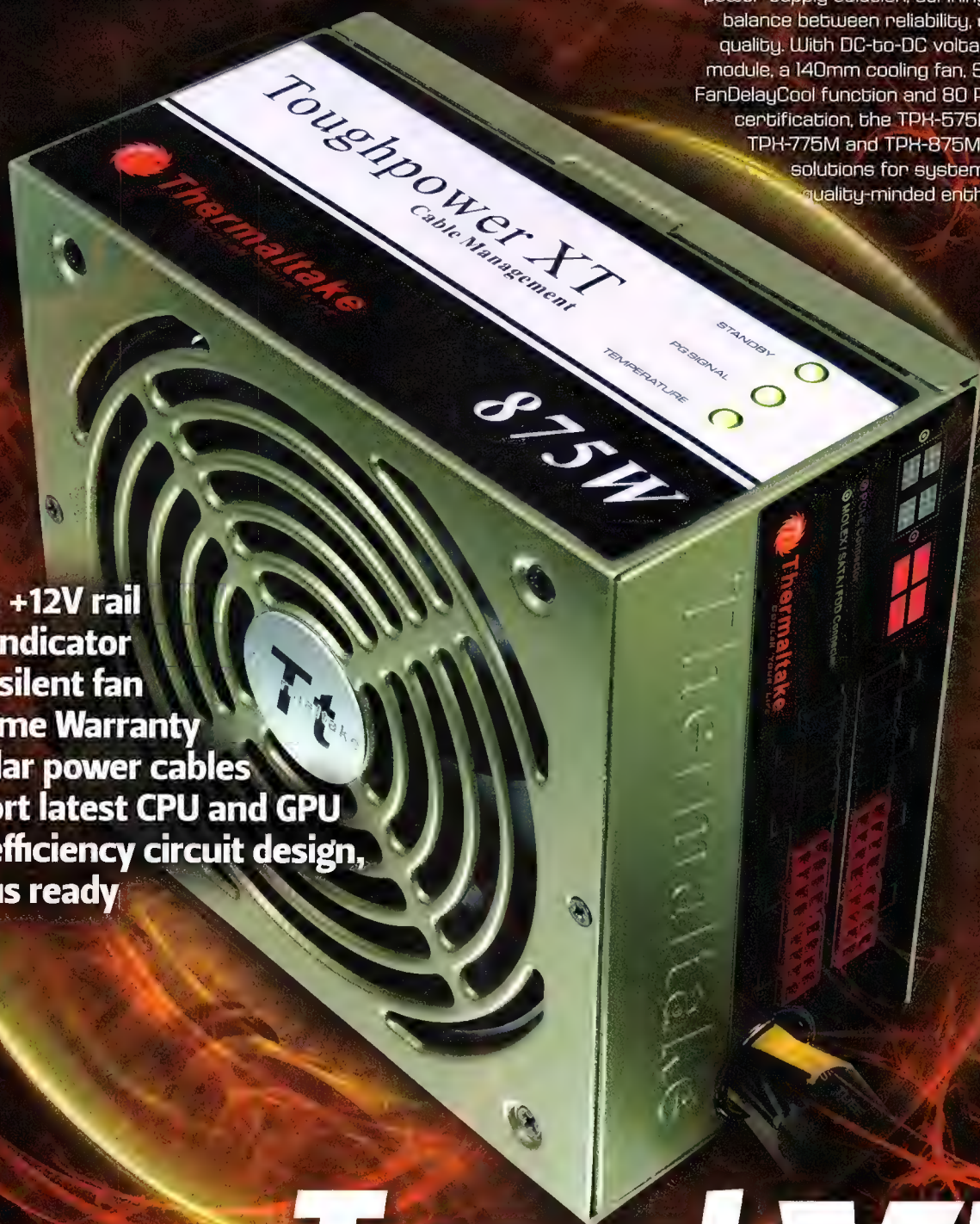


ECUManager, part of the FreeEMS project and diyefi group, showing just what is possible to probe from an engine, and adjust on the fly.



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The limitations

Ashton Mills ponders the limits of modern technology.

We like to marvel at the accomplishments in computing that we see year after year, and it seems just when we think it can't get any better that it suddenly does, sometimes in ways we don't expect.

And knowing how far we've come since the first home computer all the way through to today, it seems inevitable that this rate of progress will continue.

But are there limits? Can we excel in a particular area and go no further?

Sound reproduction used to consist of blurred

load any faster than it takes the server to serve data and the electrons to span the globe in an instant and reach your machine.

Resolution? Our monitors can go up to 2560x1600 where you're hard pressed to determine individual pixels. And our TVs can go up to 1080p, and here I will suggest there's room to grow, but not a lot more – Blu-Ray on a 1080p monitor or projector is already close to the 'so real you can touch it' grail.

Storage? The original hard drive stored 5MB and cost the GDP of a small country, and even

But how interesting to think that in some realms, certainly aural and colour fidelity at the least, there is nothing more to do. We have, as humans, reached the pinnacle. Perhaps the delivery can change (directed sound beams, 3D TV without those silly glasses etc) for some, but otherwise for others we can close the book.

Which is at once amazing and scary – have we really touched the limits of the universe for us here?

And, further, that begs the question: what are the remaining limits and what do they look like?

What a fascinating world that must be.

**I think we can all agree that
Minority Report style interactive holographic
screens would be most awesome...**

beeps way back when we had the Commodore 64's SID chip, and since then we've had 8-bit, then 16-bit and now 24-bit sound at up to 192KHz all in multi-channel glory. But there's little point in further fidelity – the human ear can't hear the difference.

And where once the PC had a monochrome green screen, before evolving to 16-colour CGA, 256-colour VGA and to the 16 million-colour 'True colour' of today, we are again reaching the limits of what our eyes can perceive. There is the addition of Deep Colour from the home theatre realm (which can provide for up to 281 *trillion* colours, though it's questionable at best since no content yet takes advantage of it), but that should pretty much flesh out the limit for us.

And bandwidth, from the days of 300 baud modems taking minutes to paint a single screen of text to ADSL and now fibre to the home just around the corner. While caps are another thing, speed is no longer an issue. Your pages don't

considering our ravenous consumption of data in our modern lives, today you can grab a 500GB hard drive for \$50 and there's near unlimited free storage online. There's no reason to want for storage anymore.

So, what's left? The obvious candidates are CPU and GPU power, which game developers seem to have little problem saturating, but even here the latest hardware can usually push 60fps for the majority of titles. Still, we know we can think of tasks that could tax these subsystems to the limits of even future systems (lets go right to end – emulated *reality* so real as to be indistinguishable from the real thing. That will require some serious grunt right there).

And I think we can all agree that Minority Report style interactive holographic screens would be most awesome, too. It's the type of evolved display technology that we know to be possible, even if not just yet.

So in these areas there's work to be done.

Limits are for other people, not Ashton.
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REPUBLIC OF GAMERS

INPUTOUTPUT

Dan Rutter brings the answers to your questions like no-one else can.

I/O OF THE MONTH

Also, check for black helicopters

I recently got a 17in monitor/TV combo screen for next to nothing; the only thing missing was the external power brick. After plugging in an old 12V one-amp transformer I had lying around with the right size plug (and luckily correct polarity) the screen worked... for a minute, then it went black. The transformer felt really hot and smelt funny (no magic smoke though).

So I chopped off the dead transformer and attached the lead and plug to a Molex connector, plugged it into the Molex socket on the back of my ATX power supply and voila! My screen works whenever I turn my PC on.

My problem now is that there are fine parallel lines moving quickly up and down the screen that change speed as I use the PC. I think it's interference from the power supply. Can I get rid of them?

Chris Kamppi

O I'm assuming that the screen is an LCD (if it's a CRT, you should have paid *less than next to nothing!*). With a CRT, the problem could be some sort of magnetic interference, but LCDs are immune to that. So yes, probably noise coming in on the power wire.

The unshielded PSU wires inside a PC pick up all sorts of noise from other nearby components, and LCD monitors expect to run from their external power brick, which has its own filtering. So the monitor doesn't have any power filtering of its own, and may well misbehave from dirty DC.

(All normal hardware that can be affected by power-supply noise – okay, not blenders and soldering irons, but all A/V equipment – does have this sort of filtering, by the way. A hi-fi amplifier, for instance, should reject all interference coming in via the mains cord. This makes it particularly ridiculous when audiophiles use super-expensive power-conditioning hardware to run their super-expensive amps.)

Blocking noise on *signal* cables can be a pain, because the signal is generally weak AC, and so is the noise. So you have to try to block the noise that's on different

frequencies to the signal, generally with a 'ferrite bead', that either comes in two hinged pieces to clip over a wire, or is one toroid piece that you loop the free end of a wire through, one or more times.

(The lumps you often see in data and DC power cables, making the cable look like a snake that's swallowed a beer can, are built-in ferrite beads.)


You've got a much simpler problem, though – AC interference on a DC power wire. You'll be perfectly happy with a filter that blocks pretty much all AC.

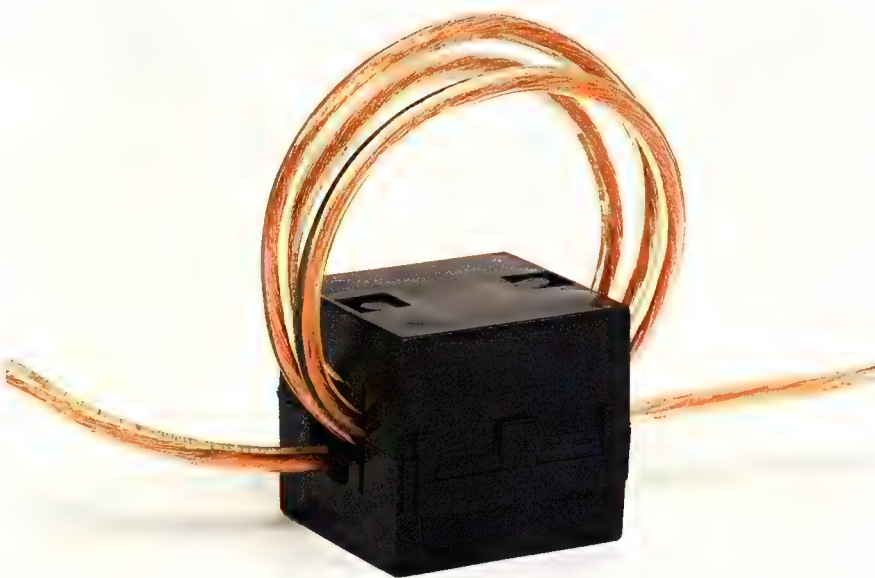
You could still use a ferrite bead, but all you need is series inductance (because inductors pass DC and block AC) and/or parallel capacitance (because capacitors pass AC and block DC). You can bodge up the former by wrapping one of the supply wires, close to the plug going into the screen, around a decent-sized nail. If the problem improves while you hold the wire in place on the nail, you're onto a winner. If the nail gets the job done, just tape or glue the wire in place around it and call it fixed.



I/O OTM

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POWER SUPPLY

Capacitance across the power wires is almost as easy. Once again, you need finesse if you're trying to let an AC signal through while blocking out AC noise. But if you just want to brick-wall as much AC as possible, all you need is a capacitor with a voltage rating above 12V, connected across the wires, once again as close to the LCD power connector as possible. A simple chunky electrolytic cap should do the job. Remember that ordinary electrolytics are polarised, though, and will do something exciting if you connect them the wrong way around. 



The usual way of sucking HF noise out of a cable.

New, from Upfly Twiddlevolt Corporation!

I Is a 'Bosston 8 Port PowerBoard Surge Protector' for \$38.90 delivered any good?

I ask because a lot of small biz clients don't want to pay for a UPS, and I'm wondering if this is at least a cheap way of ensuring their switches or DSL modems don't get naffed every 2nd week (ie turn off/back on) due to minor power issues.

In fact, while we're at it, why DO those cheapies do that all the time?

Jason Alexander

O That particular Suspiciously Cheap Surge Protector is a decent deal, because it's got *eight* switched outlets. Well, as long as it's not poorly made (tinyurl.com/scaryboard).

As far as actual surge protection goes, though, it'll just be your usual couple-of-MOVs unit that may protect you from a few surges, but will never be very good, and will soon just be a powerboard with no surge protection at all. The 'no longer protected' light on the board may or may not illuminate when this happens (www.dansdata.com/gz039.htm).

It will also do absolutely nothing to prevent DSL adapters resetting, clocks blinking '12:00', et cetera, from tiny power interruptions. There's no room inside a powerboard for the capacitors and/or inductors needed to store energy to bridge small interruptions, even if there was room for them in the purchase price. Ordinary surge protectors also don't 'regenerate' the AC waveform in any way; they just try to sink spikes to somewhere other than the connected equipment.

Proper ferroresonant power conditioners *can* ride out small interruptions, and they come up on eBay all the time, but usually 'pick-up only', for reasons of weight.

Decent-sized ferroresonant conditioners also draw around a hundred watts all by themselves. Not so bad if you need to heat the room anyway, but this is not usually the case in Australia.

I think – though wouldn't bet much on it – that the best cheap power filters around today are APC's 'Line-R' filter/conditioner doodads. I don't think they do anything that the power filtering circuitry in an APC UPS doesn't do, though. For low-powered gear like networking hardware, even a cheap UPS is likely to bridge brief blackouts very successfully.

Whoa there, Delta!

I What's the equation for using resistors to slow down a fan?

Like, if you've got a 2000RPM 12V fan, what resistor do you need to put in series with it to get it to turn at 1000RPM?

I know you can't slow them down infinitely, because they just won't start turning below a certain voltage, but you can get half RPM out of most fans, right?

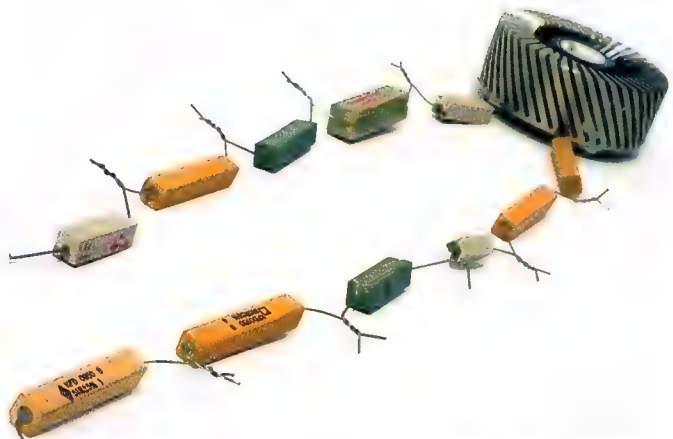
Christian Ogden

O There is no such equation. But this is still pretty simple.

Quietesting computer fans with series resistors is a great, practical way to start learning basic electronics. It's a real-world application of Ohm's Law, and it'll teach you how nice simple Laws behave in the real world, where there are lots of components that don't quite behave like the superconducting wires, impedanceless power supplies and perfectly linear resistors of Electronics Textbook Land.

To play with this you'll need a small amount of equipment from the electronics store. A \$10 multimeter, a pack of brightly-coloured alligator-clip test leads, and a couple of 6V lantern batteries to wire in series as a nice safe 12V power supply; shouldn't set you back more than \$30. Since you're exploring resistance, you'll want a lot of resistors, because that's a great deal more convenient than using coils of fencing wire in a bucket of water. A pack of a few *hundred* quarter-watt resistors, like Jaycar's \$9.95 #RR1680, will do the job.

(To connect to the little sockets in computer-fan plugs, use straightened paper clips. Red wire positive, black wire negative, ignore the other one or two wires that fans have, don't let the paper clips touch.)



"...and this end goes to the lightning rod, and that end goes to the Leyden jar..."

After following one of the numerous How To Use Your Multimeter tutorials on the Web, you'll be able to figure out how much current a given fan draws, and therefore what resistance it's giving, and what series resistance you'll therefore use to reduce its current draw by a given amount. If you're using beefy fans, you'll also smoke a quarter-watt resistor or two.

And then you can move on to Zener diodes, which are inexpensive components that drop a particular voltage, making them rather handy for this job. Then LEDs, your own fan bus, rebuilding battery packs... before you know it, a fussy golden android will be calling you "Master"!

The ol' corkscrew-in-the-bottle problem

I I'm sending you this from a computer with a brand new install of Windows 7 on it, because it went really really wrong and I couldn't think of any other way to fix it. Now I'm afraid it'll do it again.

The problem was, any time I tried to run a program, I got an error that said "Windows cannot find C:\WINDOWS\system32\rundll32.exe".

Except there WAS a rundll32.exe there. I even copied the rundll32 file from another Windows 7 computer on a USB drive, and the problem was still there. I searched for answers (on a different computer...) and just found a bunch of those rubbish Fix Registry Problem Now Only \$29.99 utilities, which are all bloody EXEs anyway, right? So I just reinstalled, and now it works.

What the hell happened, though?

Dana Price

O Oh, this one's a classic. It always used to happen when, somehow, EXE files got associated with some program or other, in the same way that you'd associate DOCs with Word or MP3s with a media player. When Windows thinks all *program files* have to be opened *with a program*, life becomes awful, if it's happening to you. Or hilarious, if it's happening to someone else.

You actually can sort of trick Windows into still opening some programs. Like, to open Notepad, do an "Open With" for some other random file, and tell it to open that file *with* Notepad, then do a control-N. This is not very helpful.

Unlike XP and earlier versions, you can't just go to Folder Options > File Types and reassociate 'EXE' with 'Application'.

There's a neat little dodge that still works, though – a program that fixes the problem, but is not itself one of the poisoned dot-exes. What you want is a utility called 'exefix_xp.com' (tinyurl.com/y6ej5b) ...which still works, even in 64-bit Windows 7.

The dot-com indicates that this program is a COM file, the good old format that came before dot-exe. Actually, COM files came before *directories*.

The format has some very severe limitations – it can be no bigger than 65,280 bytes – but that's enough to fix this irritating error. ☺

STEPPING INTO THE VOID



LIFE WITH LINUX

It's free, fast and powerful, yet Linux has only a tiny share of the market for operating systems and a terrible reputation among enthusiasts.

Mark Mackay lived with Linux and reports on whether its reputation is deserved, and what it has to offer enthusiasts.

Linux means different things to different people. To some, it's an amazing free operating system that provides a more lightweight and flexible approach than Windows. Others might be vaguely aware of it being the above, but are put off by the fact that it apparently doesn't run games very well. Then there are those for whom it conjures up images of incompatibility nightmares, and men with beards wearing tweed jackets with leather

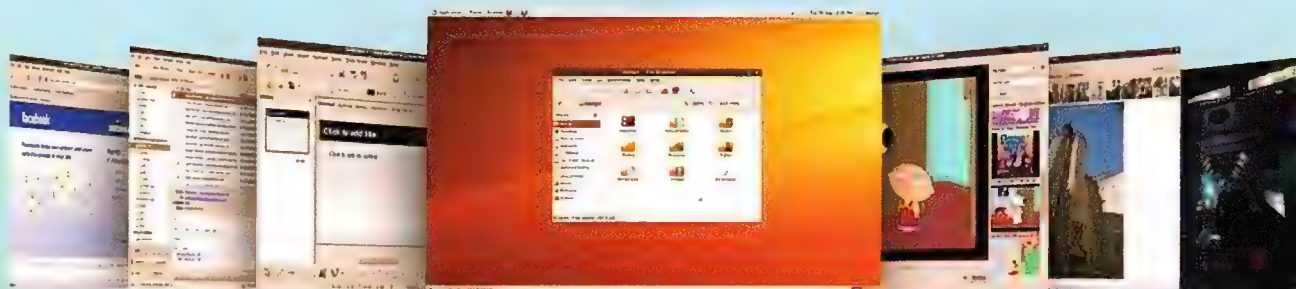
patches on the elbows. Plenty of people may never even have heard of it, or just don't care as long as Windows does the job.

You don't have to go far to find someone willing to declare next year the year of Linux, and there are lots of reasons why things ought to be looking up for it. It's free for a start, and that's a great price given the state of the economy, and also typically efficient with hardware, which is ideal for low-power netbooks. Plus, the fact

that we're using the Web for more computing means that the average user is arguably less dependent on Windows-specific software.

And yet its market share isn't growing quickly – Linux remains very much a minority OS, with a market share percentage in single figures.

We decided to find out what's holding Linux back, and whether or not it's possible to ditch Windows altogether and use Linux instead if you're a gamer and hardware enthusiast.



Ubuntu's website is friendly and approachable, and makes downloading the OS easy.

Talking to the experts

Linux is available in more flavours than Ben & Jerry's ice cream, which means that the first task for anyone wanting to try Linux is to decide on which version to use. We have friends in high places – or at least open-source places – so we caught up with contributor and noted Linux enthusiast, Andrew 'Spode' Miller to talk about Linux. "My first taste of Linux was when running a Red Hat web server back in 2000. I needed something with less overhead to run my VIA EPIA as a file server – Windows was grinding it to a halt," Spode told us. "By 2007, I was running it full-time as both a client and server. Now even my girlfriend uses Linux and prefers it to Windows."

We asked Spode which distros we should consider using. "There are a lot of distributions

team effort – individuals might write the pieces, but they're all edited and proofed by other people, and second opinions on hardware are all but mandatory. However, Mark was to be our guinea pig and he'd never so much as used a Linux operating system. In this instance, as it was him taking one for the team and not all of us using Linux, we're making an exception for the rest of this feature. So, over to you Mark.

The installation

All I knew about Linux was that it was free. I'd also heard that if you wanted to open a folder, you had to use some of kind of programming text. To say that I am a programming noob would be something of an understatement. My ex-girlfriend's dad was a retired computer

software. I half expected them to write the feature for me too.

I followed the steps outlined in the instructions, restarted the PC and decided that I'd earned a cup of coffee for my efforts. When I returned with the brew, Linux was apparently installed and ready to go. I browsed through the programs and applications, and all seemed well. However, it turned out that Linux was actually running from the ISO and hadn't installed to my hard disk. My first Linux fail.

I restarted my PC and began the installation process for real. It isn't dissimilar from that of Windows – you can choose which drive to install it on and the partition size. There was already a copy of Microsoft Windows installed on the hard disk on which Ubuntu was installed, and Ubuntu graciously gave the option of copying all documents, including music and movies, to Ubuntu so that they were ready to rock from the outset, which was a nice touch. Once the relevant OK and Next prompts had been clicked, the system was good to go and Ubuntu had even retained the desktop image from the previous Windows installation.

Download the OS, burn the ISO file to a CD, put it in your optical drive and restart. Maybe this wasn't going to be so bad...

around, each perfect for different uses. Ubuntu is one of the most popular distributions. With this there's a large community of users that can offer support to your problems. Having someone to fall back on is essential when you're new to something, and this is my primary reason for suggesting it."

Spode went on to tell us that "one problem with Ubuntu is that out of the box, it only has packages that are legal in every country and have no questionable patent infractions. This can mean getting very frustrated trying to do simple activities such as play DVDs or Flash." Spode also gave us a few hints and tricks to help us along the way, but we wanted to get the raw Linux-n00b experience, so we put them to one side and cracked on with installation.

We don't usually refer to ourselves in the first person at Atomic. Making the magazine is a

scientist who helped to invent the information compression code for the fax machine. He first told me about Linux and loaned me a book on the programming language C – my brain was melting by page two.

Another thing I knew about Linux is that it doesn't run games very well. If I'm at home on my PC, I'm either playing a game or deciding which game I should start playing. The thought of wrestling with drivers and other compatibility issues isn't my idea of fun. Having no idea where to start, I followed Spode's advice on taking on Ubuntu, and headed to **www.ubuntu.com**

Thankfully, the instructions are idiot-proof. Download the OS, burn the ISO file to a CD, put it in your optical drive and restart your PC. Maybe this wasn't going to be so bad. The website even offers a link to free ISO-burning

Installing drivers

Everything seemed to be working when Ubuntu first loaded. As with Windows Vista and 7, there's a reasonable set of default drivers installed. The Ethernet port was working fine, and the screen resolution was correctly set. However, there wasn't any audio. My home system has a Creative X-Fi Xtreme Gamer sound card, so I figured this must be a driver that I had to install myself. Fair enough. I went to the Creative website, and found that it has a Linux driver, and even a readme file with some installation instructions. The installation instructions read as follows:

- 1) Go to source directory
- 2) Execute make command as root
make
make install

This is the point then, where the acronym 'WTF?' ceases to be adequate for the situation. What in God's name was I supposed to do with that? The land of double-clicking EXE files felt like a lifetime ago – and one to which I badly wanted to return. After a lot of forum browsing, I found that in order to 'Goto source directory', I had to open up something called the Terminal – which is like the command prompt in Windows – type in 'sudo -s -H' and hit enter.

How intuitive. Why didn't I think of that?

After scorning myself for missing the obvious, I then found out that in order to open a directory, you have to type in 'cd', followed by the name of the folder. Once here, the term 'make' will put together the code of the driver, and the command 'make install' will finish the job. Piece of cake.

Aside from all the trial, error, research and frustration involved in figuring all of this out, when the Terminal works, it's immensely satisfying. Maybe this is because I've always been such a failure at programming and this made me feel as though I'd actually achieved something in this area. Either way, I now seemed to have all drivers installed and it was time for phase three of the operation.

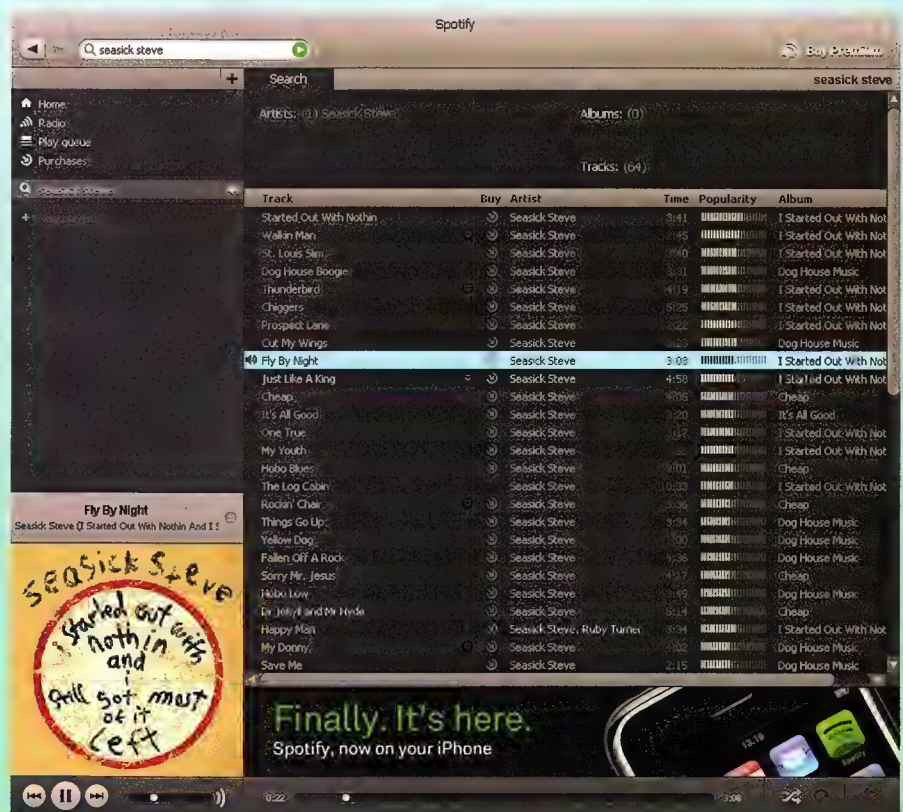
Instant messaging

Logging into an entirely new operating system on your beloved PC is a pretty weird feeling. It's like coming home to your house and finding that all the furniture has been rearranged, with some new chairs having appeared in obscure locations and others having disappeared altogether. With the drivers installed, I took a little time to browse around, and overall, the interface was surprisingly smart.

One particularly gaping hole that presented itself during my first moments of Linux was the lack of Windows Messenger. Having let a complete stranger into my SpinPoint disk, I felt cut off from humanity and deserted by the team. As I inspected the layout, I found the applications menu with Empathy Messenger in the subsection for Internet Applications.

Apparently the program works with many IM programs such as MSN and Yahoo! Messenger, so I punched in my Hotmail details and fired it up. Nothing happened. I fiddled around with a few settings, browsed some forums for information on how to set up Empathy so that I could log in with my Hotmail details. Everything seemed fine, but in the end, it just kept flaking out on me.

During my forum browsing, I came across mention of an application called Pidgin messenger, which is apparently downloadable



via the Ubuntu Software Centre. This is a feature in the operating system that allows you to download and install software from various sources on the Internet. It isn't the only way to add new software, but the idea of having a part of the OS dedicated to exploring new apps is foreign to a Windows user.

Rather than having to mess around with the terminal, you can punch in the name of pretty much any part of (Linux) software you want and you'll likely find it there. If it isn't there, a quick Google search will give you the name of a download source to add to the list in the Software Centre. After that, you're in business.

Once Pidgin was installed, it worked the first time. It's compatible with all of major IM systems, including MSN, ICQ and AOL. It provides red underlines for typos in the input field and handy overlays to let you know when someone has said something so that you can read the text without switching windows. It's a great piece of software and easily the equal of its Windows equivalents.

Music and movies

Now that I was back in contact with the rest of the population, music was the thing to tackle.

You can run Spotify (an awesome online music streaming app, which is technically not available in Australia – but hey, I know some cool tricks with proxies!) on Ubuntu via an app called Wine. Wine is actually an acronym, and stands for Wine Is Not an Emulator. Obviously, the acronym refers to itself and this is apparently a type of joke. Very funny.

Still, it means that you can run Spotify and, perhaps more importantly, Steam – but more about that later. I downloaded Spotify and ran the executable by right clicking and selecting the option to open it using Wine. The installer ran without a glitch and I didn't even have to open the dreaded terminal. Blessed be the makers of the Wine. It's a fine vintage.

I punched in some music for Spotify and it played without complaint. That is, until the commercials started. I assume that it was the commercials that caused Spotify to stop




```

root@mark-desktop: /home/mark
File Edit View Terminal Help
mark@mark-desktop:~$ sudo -s -H
root@mark-desktop:/home/mark# apt-get install build-essential
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  linux-headers-2.6.31-14
Use 'apt-get autoremove' to remove them.
The following extra packages will be installed:
  dpkg-dev fakeroot g++ g++-4.4 libstdc++6-4.4-dev patch
Suggested packages:
  debian-keyring debian-maintainers g++-multilib g++-4.4-multilib gcc-4.4-doc
  libstdc++6-4.4-dbg libstdc++6-4.4-dev gcc-4.4-dbg diff-doc
The following NEW packages will be installed:
  build-essential dpkg-dev fakeroot g++ g++-4.4 libstdc++6-4.4-dev patch
0 upgraded, 7 newly installed, 0 to remove and 0 not upgraded.
Need to get 6,999kB of archives.
After this operation, 23.5MB of additional disk space will be used.
Do you want to continue [Y/n]? y
Get: 1 http://gb.archive.ubuntu.com karmic-updates/main libstdc++6-4.4-dev 4.4.1-4ubuntu9 [1,490kB]
Get: 2 http://gb.archive.ubuntu.com karmic-updates/main g++-4.4 4.4.1-4ubuntu9 [4,701kB]
Get: 3 http://gb.archive.ubuntu.com karmic/main g++-4.4 4.4.1-1ubuntu2 [1,446B]
Get: 4 http://gb.archive.ubuntu.com karmic/main patch 2.5.9-5 [100kB]
Get: 5 http://gb.archive.ubuntu.com karmic/main dpkg-dev 1.15.4ubuntu2 [573kB]
Get: 6 http://gb.archive.ubuntu.com karmic/main build-essential 11.4 [7,172B]
Get: 7 http://gb.archive.ubuntu.com karmic/main fakeroot 1.12.4ubuntu1 [126kB]
Fetched 6,999kB in 5s (1,191kB/s)
Selecting previously deselected package libstdc++6-4.4-dev.
(Reading database ... 129506 files and directories currently installed.)
Unpacking libstdc++6-4.4-dev (from .../libstdc++6-4.4-dev_4.4.1-4ubuntu9_1386.deb) ...
Selecting previously deselected package g++-4.4.
Unpacking g++-4.4 (from .../g++-4.4_4.4.1-4ubuntu9_1386.deb) ...
Selecting previously deselected package g++.
Unpacking g++ (from .../g++_4.4.1-4ubuntu9_1386.deb) ...
Selecting previously deselected package patch.
Unpacking patch (from .../patch_2.5.9-5_1386.deb) ...
Selecting previously deselected package dpkg-dev.
Unpacking dpkg-dev (from .../dpkg-dev_1.15.4ubuntu2_all.deb) ...
Selecting previously deselected package build-essential.
Unpacking build-essential (from .../build-essential_11.4_1386.deb) ...
Selecting previously deselected package fakeroot.
Unpacking fakeroot (from .../fakeroot_1.12.4ubuntu1_1386.deb) ...
Processing triggers for man-db ...
Setting up patch (2.5.9-5) ...
Setting up dpkg-dev (1.15.4ubuntu2) ...
Setting up fakeroot (1.12.4ubuntu1) ...
update-alternatives: using /usr/bin/fakeroot-sysv to provide /usr/bin/fakeroot (fakeroot) in auto mode.
Setting up libstdc++6-4.4-dev (4.4.1-4ubuntu9) ...
Setting up g++-4.4 (4.4.1-4ubuntu9) ...
Setting up g++ (4.4.1-1ubuntu2) ...
update-alternatives: using /usr/bin/g++ to provide /usr/bin/c++ (c++) in auto mode.
Setting up build-essential (11.4) ...
root@mark-desktop:/home/mark#

```

producing any music; although I didn't hear any commercials, the music would play for the sort of time you'd expect to hear prior to one kicking in.

After more forum browsing and some fiddling but with no success, I arrived at the conclusion that Spotify was just going to keep flaking out on me. Not to worry, though, I had a folder full of great music and there was a media player bundled with Ubuntu. I fired up Rhythm Box Music Player, imported my playlists and set the first track to play. Nothing happened. A small 'x' started appearing next to each track that I tried to play, and next to all those below. The more tracks I clicked, the more this happened, and there was no hint of any music. I assumed that this meant it wasn't going to play ball, so I fired up the forums once more and began browsing.

During my search for technical assistance, I came across a media player called Banshee, which people were alternately lamenting and praising as the iTunes of the Linux world. I ditched Rhythm Box, downloaded Banshee

and began to install it. I should have expected that installation wasn't going to be easy, but I didn't expect that installing the software was going to mean following a four-part guide that featured seven lines of code, which had to be typed into the terminal. At this point, I was physically yearning for a double-clickable executable (and yes, it was only after following the guide that I remembered about the easy-to-use Software Centre).

Even with Banshee installed and my music files imported, it still wouldn't play them. More forum browsing didn't help, so I made a last-ditch effort, and dragged and dropped a few albums into Movie Player. Finally, I had some music that worked.

With music taken care of, I decided to fire up an episode of Family Guy. I'd ripped the files in MPEG-4 format and they were playing fine, but without any audio – even installing the Linux version of VLC didn't help. Forum browsing revealed scores of people who were experiencing similar issues. Different fixes were



If you want to play games on Linux, you'll have to learn how to compile drivers and applications.

being posted for different versions of Ubuntu and other distros, with some of the fixes working for some people but not others.

I decided to watch an AVI instead.

Gaming

With music and video sort of working, it was time to tackle the big one – gaming. Thanks to the DirectX API, PC gaming is very much tied to Windows.

Can a gamer save a couple of hundred on an OS and still play games? I downloaded and installed Steam using Wine. Getting Steam running on Ubuntu wasn't a problem, and its IM features worked fine too. I decided to go easy with Linux at first and installed an awesome indie game, Trials 2: Second Edition.

The splash-screen with the options for selecting the settings opened up easily, so that was a good start. However, in what was very much appearing to be true Linux fashion, it all fell apart when it came to playing the game. The game froze on the opening screen, with obscure patterns of yellow and magenta dotted over the screen.

It looked like a driver update was going to be necessary. ATI provides Catalyst drivers for Linux, although even its own download page states that "ideally, you should use a distro-specific process for a less painful experience", which hardly fills you with confidence.

The driver was a .RUN file, which isn't something I'd seen before. A quick browse through the helpful community on the Ubuntu forums soon had me on my way, even if it involved the basic use of the scary Terminal.

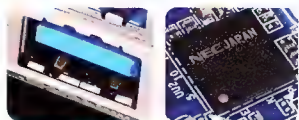
With the driver apparently installed successfully, I fired up the game again.



Simply Fast: The New GIGABYTE X58A-series of Motherboards

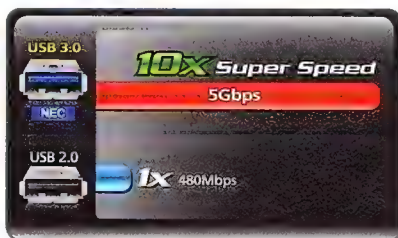
The GIGABYTE X58A-series delivers unparalleled performance with SuperSpeed USB 3.0 technologies from NEC and SATA Revision 3.0 technologies from Marvell mounted directly onboard; this is superior to a makeshift add-on card solution that could create a bottleneck at the PCI-E slot when 2 or more SATA 6Gbps devices are attached to it. GIGABYTE X58A motherboards also provide an unprecedented 3x USB power boost on all USB ports for even the most power hungry USB devices. There are also all the usual technologies from GIGABYTE that include Ultra Durable™ 3, AutoGreen, DES2 and GIGABYTE Smart 6 for easier and smarter PC system performance, power and security management.

GIGABYTE 333 Onboard Acceleration USB 3.0 – 10x Super Speed



World's first USB 3.0 logo certified solution from NEC

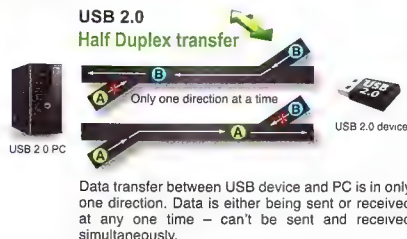
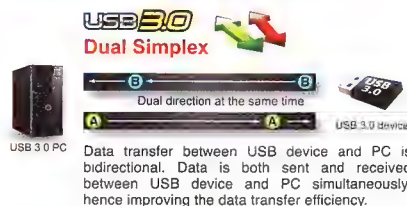
GIGABYTE X58A motherboards feature the next-generation SuperSpeed USB 3.0 interface from NEC that provides a 10x data transfer speed boost over USB 2.0. Data transfer between the PC and USB 3.0 devices is enhanced through dual-simplex transfer for simultaneous bi-directional data flow.



Faster Data Transfer



Better data transfer efficiency



USB 3x Power Boost



Utmost compatibility with 3x USB power boost

GIGABYTE X58A motherboards introduce a unique new USB power design that effectively triples the power output from all USB ports. The result is unequalled USB device stability due to sufficient power delivery from a single USB port. This also frees-up USB ports for additional USB devices.



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GA-X58A-UD7

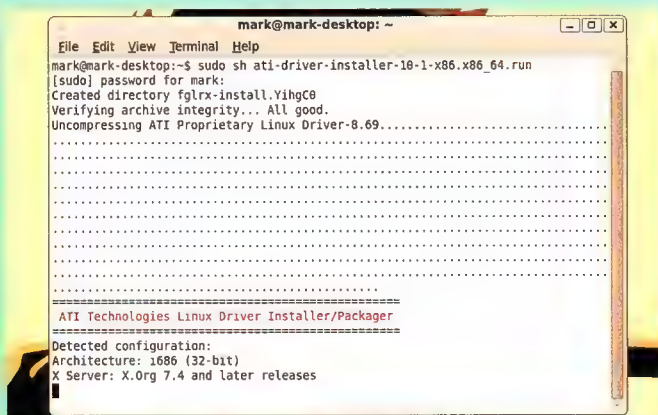
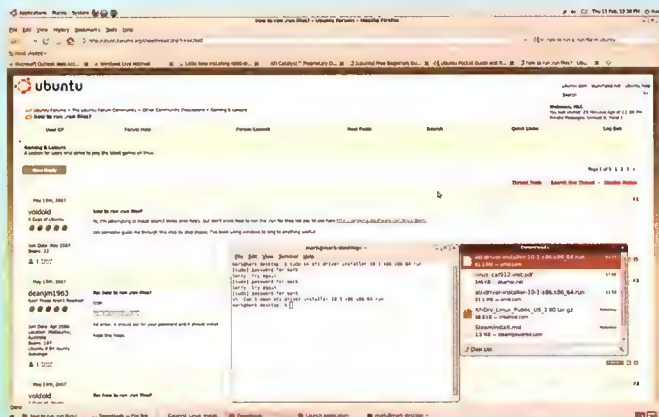
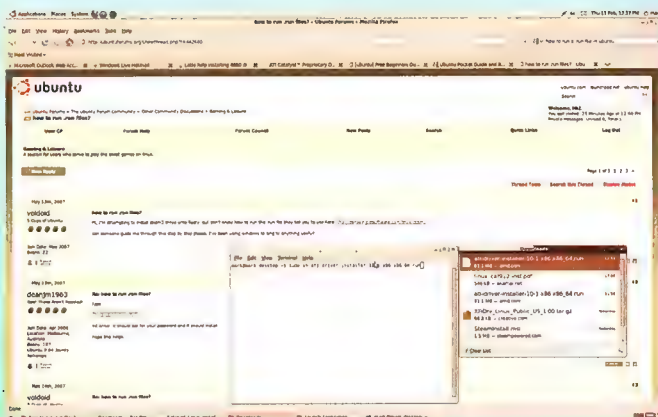
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<http://gigabytedaily.blogspot.com/>



You'll spend a lot of time on forums finding out how to perform basic tasks.

Life with linux

The bundled software for image editing and word processing is excellent, and many people will use it in Windows. The Gimp Image Editor is has been around for just about forever, and even sees some use in our benchmarking for Head2Head tests, while Open Office is much very like Microsoft Office except that it's free. There's a word processor, spreadsheet and a presentation package all at your disposal. These applications are very much fit for their intended purposes, and were used for this feature without presenting any issues.

The other bundled software with the operating system is pretty comprehensive. There are applications for burning CDs, organising photos and all those other jobs that you can perform yourself using the operating system but for which you'd rather have software to do the job. Using Linux for general tasks such as these is absolutely fine, and at no point did I encounter moments that left me longing for Windows.

There are a couple of awesome touches with Linux, and I was surprised that Microsoft hadn't thought of these before. For example, down at the bottom right-hand corner of the interface is a button that switches between workspaces. It's like having another display of the same resolution sitting abreast of the one in front of you and being able to flick between them. This means that you could have a Word document, and all your research sources and work material on one workspace, while having your music player and IM and Twitter programs on the other. This essentially gives you double the desktop space to play with and it's massively useful. Not surprisingly, Apple has adopted it for its latest version of OS X.

There are a few features missing, though,

This time, the game didn't freeze and produce colours that resembled the emptied contents of someone's stomach after a dodgy kebab, but the images were very blurry. I found a post on the forums from a fellow Trials 2 fan, but it had been posted in April 2008 and no one had replied. I decided to move on to some relatively undemanding and perhaps more popular titles.

Counter Strike: Source was my next choice. I was fully expecting everything to go according to plan right up till the moment when I took control of my terrorist and had to shoot something. This is precisely what happened. All the loading screens were as they should be, servers were found without a hitch and I even managed to join one. However, with the game apparently loaded up, it froze at the server welcome screen. Back to the forums I went.

Mercifully, I found a full guide on how to set

up at <https://help.ubuntu.com/community/CounterStrike>. This takes you through the process from scratch. I removed Steam and Counter-Strike from the system, and then started installation again from the beginning. The list of steps that you have to take to get the game running is ridiculous, with extensive use of the intuitive-forsaken Terminal. However, once I'd spent an hour or more working my way through the guide, everything worked smoothly and I finally had something to do on those lonely nights in with my Linux PC.

I installed a few simple games, including Gish, which is a side-scrolling flash game; it worked without a hitch. Similarly, browser games such as the awesome Desktop Tower Defence played without any problems. I looked around to see if there were any other games that were made for Linux but, for a PC gamer accustomed to triple-A titles, there were but few noteworthy games to be found. Ubuntu is bundled with a few games, but they're very much of the same ilk as those you might expect to receive for free with Windows.



mainly in the form of small touches that you use a lot and don't really miss until they're gone. There's no search field at the top of a window so that you can find files quickly, for example, which is a Windows feature that has worked well since Windows Vista. Tasks such as taking a screenshot have to be performed using applications and the pre-installed app doesn't have a shortcut key, so you have to open it up each time you use it. You can't change the names of files by clicking the name of the selected file, and Pidgin messenger emits a noise similar to that made by Windows when you unplug a piece of hardware, which makes your heart skip every time it sounds.

During the couple of weeks I lived with Linux, I managed to run a few more games in Linux, including Team Fortress 2, Mass Effect, Half-Life and The Witcher. There's a list of some 4,000 games that can be run using Wine. However, as with almost everything that I tried on Linux, getting things up and running is a gigantic pain in the kernel.

The list of steps that you have to take to get the game running is ridiculous, with extensive use of the forsaken Terminal.

When games were up and running, momentary lapses in the frame rates and rendering anomalies occasionally occurred, and, sometimes, the operating system would panic and freeze in a relatively dramatic fashion.

Audio seemed to be a particular problem for Linux. Perhaps this was something to do with my lack of experience when working with the Terminal to install my sound card driver, or perhaps it was something to do with Creative's driver. When logging in, some applications would play music fine while others that were working the day before refused to produce a single note.

Apple has made syncing the iPhone with other software a nightmare at the best of times. Throwing Linux into the mix was bound to end up in a tangled knot of software problem wrestling, the likes of which has never been considered tangible. Thankfully, there are several good guides available that give clear, concise instructions. They're fairly lengthy, but after a lot of trial and error, and some forum browsing, I could sync my iPhone with the Banshee music player without a problem.

Conclusion

My weeks with Linux were filled with trials and tribulations – and forum browsing. Talking to people about Linux prior to this feature, I'd always said, "No thanks, the thought of using programming to open up a folder doesn't push my buttons". However, I'd been assured many a time that "it isn't like that anymore". There's some truth to this, as you can browse folders and navigate to programs just as easily as in Windows. Also, in terms of overall UI, Ubuntu is surprisingly polished.

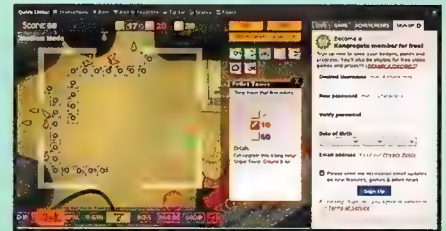
The problems start when you want to do anything outside of this realm. If you have a netbook, for example, and are sitting in Starbucks sipping on your chai tea latte and pootling around a few websites, you'll be fine. If you're running your desktop PC and want to install a driver for a Creative sound card, and then sync your iPhone to your PC, you're in serious trouble – especially if you don't have a head for figuring out technical problems.

There's a lot of talk on the Linux forums

about how "Linux does support games but it's the developers that don't support Linux". Technically, this is true – there's nothing wrong with Linux's OpenGL support, but very few games use OpenGL. Most use DirectX, which is a Windows-exclusive technology, and getting them to run on Linux inherently involves hacking, tinkering and translation layers such as Wine.

Technicalities aside, the end result for someone like me – a guy with a gaming PC on which he wants to play his PC games – is a nightmare. Only the most intense of four letter words can convey such a gamer's frustration. A number of games eventually work, but it's hard work getting there. The fact is that if you opt for Linux to save money, by the time you get a couple of games working, you could easily pay more than the price of a copy of Windows for someone to just come along with an executable that would install the game simply and probably run it for you when it was finished too.

Clearly, Linux has advanced a long way over the years. Unfortunately, while it's perfectly usable for mainstream users, it lacks big brand-name software – there's no iTunes, Photoshop



You'll spend a lot of time on forums finding out how to perform basic tasks.

or Microsoft Office. For enthusiasts, it's likely to be a frustrating experience due to Linux's development being focused on creating an experience acceptable to the mainstream; what Linux defines as a power user is really someone with a lot of computing knowledge and patience.

There are a great many helpful and talented people working on and using Linux. While I was never happy to have a program crash send me to the nearest Linux forum, often the people there were happy to try to help. With talented nerds all over the world constantly working to improve issues, perhaps the ultimate end goal for the operating system is to be entirely smooth. However, I can't help but wonder if these people actually enjoy Linux in its current state. Problem solving brings its own gratifications and the enthusiasm that the excellent Ubuntu community has for getting to the bottom of such problems is both inspiring and, quite frankly, a little disturbing. During my two weeks with Linux, I think I spent more time browsing forums than I have during my entire lifetime. When things do work, though, it's a satisfying feeling. Perhaps part of the attraction for programming-inclined people is the opportunity to flex their coding skills and get their kicks using the Terminal to control their operating system. I can see the attraction here, but if you're a gamer, for the love of all things that run smoothly, stick with Windows. For the time being, Linux is primarily about one thing – troubleshooting. ☹️

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\$5699 + \$44 Blu-Ray Burner
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Intel Core i7 860 (2.80GHz)
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 Antec Two Hundred, 750W

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 + \$140 Blu-Ray Reader
 + \$316 Core i7 870

REDBACK SILVER




Intel Core i5 750 (2.66GHz)
GIGABYTE P55 Chipset
 Corsair 2GB DDR3 (1333MHz)
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 Gigabyte HD 5670, 1GB
 Antec Two Hundred, 550W

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GIGABYTE H55 Chipset
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HORNET GOLD




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GIGABYTE H55 Chipset
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 Intel 733MHz Graphics, HDMI
 CM Centurion 5 II, 500W PSU

\$949 + \$25 1TB HDD, 64MB
 + \$109 Radeon HD 4770
 + \$110 Intel Core i5 670

HORNET SILVER




Intel Core i3 530 (2.93GHz)
GIGABYTE H55 Chipset
 Corsair 2GB DDR3 (1333MHz)
 500GB HDD, 2 Ch. Speakers
 Intel 733MHz Graphics, HDMI
 CM Centurion 5 II, 500W PSU

\$699 + \$25 1TB HDD, 64MB
 + \$26 Core i3 540
 + \$95 4GB Memory

BEETLE




Pentium Dual E5400 (2.70GHz)
GIGABYTE G41 Chipset
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 500GB HDD, 2 Ch. Speakers
 Intel X4500 Graphics
 Aywun Black Case, 420W PSU

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HARDWARE

NEWS, REVIEWS AND ROUNDPUPS ON THE LATEST HARDWARE

Phwoar! This month is a busy one in the hardware world, and first up we pit two budget processors against each other in a battle royale to the death! Well, it's not that final, or royal, but the results sure are intriguing.

We're also taking a look back at the GTX480 architecture this issue, grabbing a helping hand from EVGA to bring you everything you'd ever

want to know about what they're like in SLI. But are they worth it? The answer may surprise!

We've also got the first retail system built around the cards, and plenty of other excellent hardware that fill in the next few pages. To top all this tech off we've quizzed you, the faithful Atomicans, and have pieced together a look at what you're all running at home. Do your rigs meet the grade?

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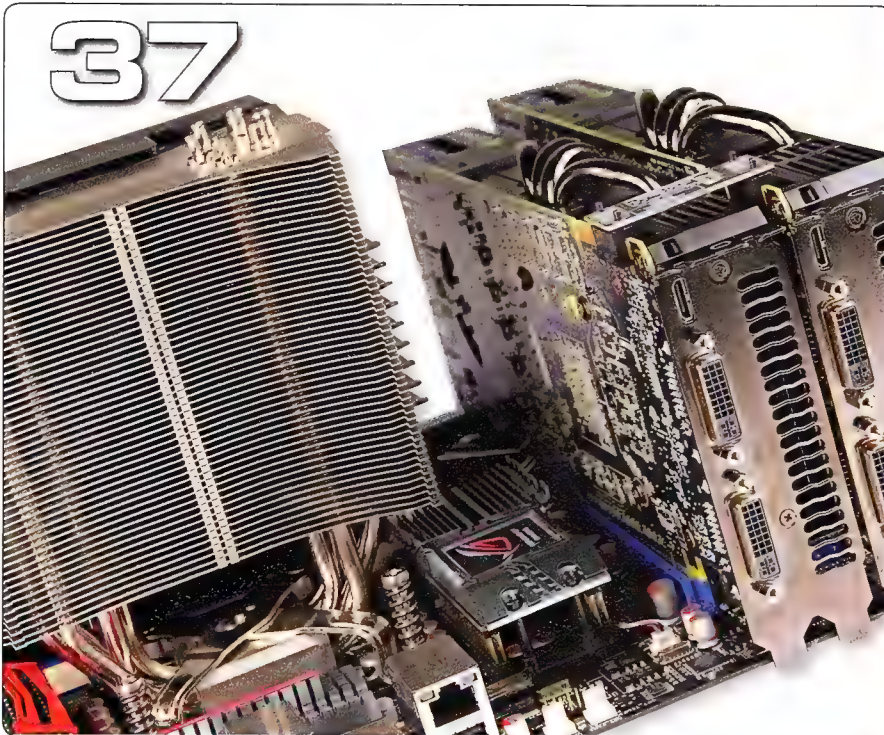
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KITLOG

64



Intel Core i3 540

A not-quite-so-budget budget chip?

Street Price \$170 Supplier Intel

Website www.intel.com

Specifications 3.06GHz dual core; 32nm manufacturing process; 'Clarkdale' core; 64KB L1, 256KB L2, 4048KB L3; 25x multiplier; 73W TDP; LGA1156; integrated Intel Graphics Media Accelerator HD @ 733.

Intel's new range of 32nm processors are known in the industry as A Big Dealä. They've got advertisements running everywhere from your television set to the radio; on billboards and boxes, and for those who pick up IR transmissions from orbiting satellites, they're transmitting through them as well. For all the fuss kicked up about them, the first 32nm chip from Intel we looked at wasn't so amazing – though their second iteration of 32nm tech, the hexa-cored Gulftown, was in-frickin-credible. We're looking at the budget version of the first chip today, though you'd be hard-pressed to guess that with a large pricetag of \$170.

The majority of this added cost comes not from the amount of traditional processing cores carried onboard (two for those interested), but rather from the integrated graphics core. Although this is contained within the CPU, and shares the umbrella of the Integrated HeatSpreader (IHS), the graphics core is *physically* separated from the processing cores, instead sharing the same silicon wafer or 'package'. In effect, the Northbridge has moved from the motherboard to the processor, and to fulfil the display output requirements you've also gotta have a H55/57 based motherboard that knows how to play along nicely.

This design is rife with drawbacks. In the process of adding in the (depressingly barely-able-to-accelerate-HD-video) graphics core, Intel have infuriatingly ripped the memory controller out of the processing cores and have moved it in *with the GPU!* Not only does this mean that latency times are goshdarn

hideous even when compared to a budget AMD chip, but it also means that pure memory bandwidth numbers take a hit, too. And in usual Intel fashion, this chip is arbitrarily limited to a max stock memory speed of 1333MHz.

Thankfully the processing cores aren't too shabby; giving pretty good-lookin' scores in all single-threaded and multithreaded benchmarks. The inclusion of HyperThreading lends a hand to the Cinebench scores, but gives a fantastic result to the memory-hungry wPrime – a 2.46 speed increase compared to a single core, which comes from the much-reduced need to access data. Instead, the second core shares the already-fetched workload, and thus HyperThreading works its magic.

Overclocking was an easy affair even with the included stock heatsink, a cooling device that contains about as much metal as a nugget has actual chicken. We were able to push the chip all the way up to 4267MHz with 185x23 at 1.432V, netting a lovely performance jump. OCCT and Cinebench multi were run concurrently at these settings on the stock heatsink alone; and the system didn't crash once. Strangely, once we changed heatsinks to our trusty TRUE, overclocking headroom didn't increase at all. We tried clearing CMOS settings, playing around with voltages, sacrificing virgins to the all-powerful mountain gods – nothing seemed to work.



That said, we're not complaining about a 39 per cent overclock in the slightest. We will, however, complain about exactly where this chip is intended to go – and that it's not aimed at us. For the \$170 asking price, you get a dual-core CPU that's relatively capable, and a GPU that is as appealing as fish custard. Throw in at least \$130 for a motherboard that can use it all (though P55 will give you access to just the processing cores), and you're looking at \$300 – whereas a competing AMD option will give you quadcore with a decent graphics chip for even less money. For an office system, the Core i3 series are pretty ok. For a HTPC, they leave us wanting – and for a gaming rig they're a terrible choice. In short, nothing that we'd run at home. There's limited fun overclocking this chip and integrated GPU, but it's a bad choice. **JR**

Intel Core i3 540

	i3540	133x23; DDR3-1333 7-7-21	150x23; DDR3-1500 7-7-21	175x23; DDR3-1600 7-7-21
PiFast	30.0s	26.58s	22.78s	
wPrime 32M – single thread	43.04s	38.049s	32.698s	
wPrime 32M – multi-thread	17.503s (2.46x efficiency)	15.459s (2.46x)	13.447s (2.43x)	
CineBench R10 64-bit – single thread	4130	4695	5546	
CineBench R10 64-bit – multi-thread	9053 (2.19x efficiency)	10040 (2.14x)	12512 (2.26x)	
Everest Read	8946MB/s	9290MB/s	11559MB/s	
Everest Write	6746MB/s	7608MB/s	8868MB/s	
Everest Latency	84.1ns	83.8ns	66.5ns	



AMD Athlon II X2 255

Very attractive price, but there's not much else.

Street Price \$100 Supplier AMD

Website www.amd.com

Specifications 3.1GHz dual core; 45nm manufacturing process; 'Regor' core; 128KB L1, 2048KB L2; 15.5x multiplier; 65W TDP; AM3.

Suffice to say, AMD have not had such a rosy time in the CPU business of late. While their products aren't bad (and indeed fill an essential hole in the market), it's very hard for an enthusiast to look to them for most of our needs – namely, the best darn performance we can grab. This doesn't blow out to the other end of the scale, either, and rather we mean a chip that does all you want it to *for the right price*. The Athlon II X2 255 certainly appears as an appealing processor at the pricepoint of only a hundred dollars; at this level it seems almost an impulse buy, rather than a full-blown CPU purchase. We'd reckon that's because it isn't a full-blown CPU – at least, not in the way that we define processors.

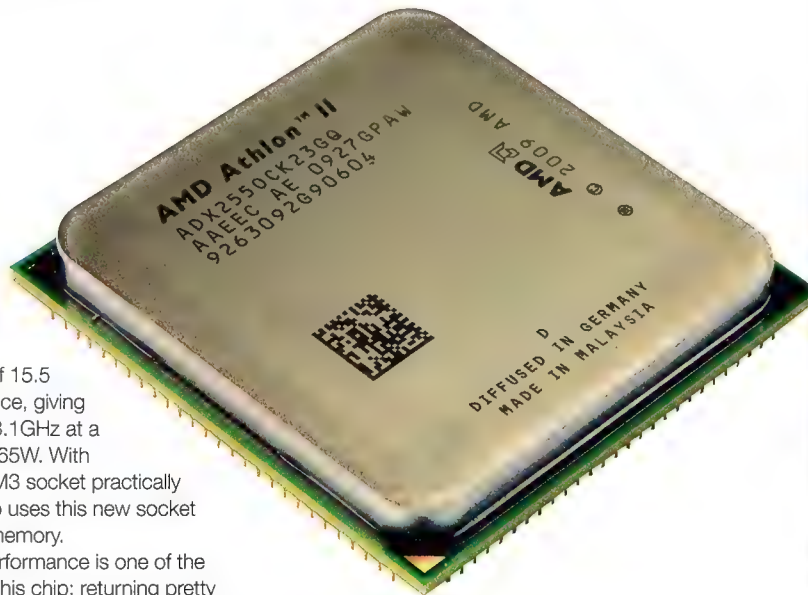
Taking a quick look at the specifications for this chip is all you really have to do to get an idea of its ultimate performance. Based upon the same Phenom II die that all the II series chips are, the Athlon II 255 is bequeathed the 'Regor' version of the die. This contains the same amount of transistors as AMD's top-end chip, but due to partial faults in manufacturing, two of the cores have been deactivated. For those budget-conscious folks out there, these budgetesque dual-core processors possess great potential for a motherboard with an unlocking tool, but getting access to those cores is not 100% reliable.

128KB of L1 cache sits at the heart of each core, split down the middle into two identically sized pools for Instruction and Data sets. The budget nature of the Athlon kicks in again when we hit the L2 cache; a measly 1024KB per core for a total of 2MB. While the L2 cache can be

shared between the two cores depending on workloads, it's still pretty abysmal. A locked multiplier of 15.5 is actually pretty nice, giving a stock speed of 3.1GHz at a pretty low TDP of 65W. With the jump to the AM3 socket practically complete, the chip uses this new socket alongside DDR3 memory.

The memory performance is one of the nicest features of this chip; returning pretty great bandwidth scores for the price, as well as a latency that gives Intel's high-end chips a run for their money. Unfortunately, this dual-cored chip simply lacks the grunt to make any noticeable headway against even Intel's budget I3 540 chip; slow PiFast results match up with a similar slowness in every single-threaded app. Multithreaded applications are handled with aplomb, but quite a small plumb, since performance only reaches 1.90 times the speed of a single core. Clearly, AMD would benefit from something similar to Hyperthreading.

Luckily, budget processors are infamous for their overclocking prowess, and the 255 isn't much of a slouch in that aspect. We threw it underneath a decent heatsink and pushed clocks harder than a drug dealer at an electrofunk concert, hitting a ceiling speed of 4234MHz using 15.5x278 at 1.45V. This is an impressive speed increase, but it came at the expense of an aftermarket heatsink. When building to a budget this is something to avoid,



and it makes more sense to spend a little more on the Phenom II X4 620 for not many more dollars.

While it's completely possible that you may be able to unlock the extra cores that are packed into the die, a dualcore chip simply won't cut it in today's world. It's also becoming something of a strange trend to buy a processor that *only* has two cores – the Steam Hardware Survey has had dualcore CPUs trending downwards for the past eighteen months solid. There are still plenty of dualcore chips floating out there already, but it's clear that quadcore is the way you'll really want to head; especially when developers support them.

The 255 simply isn't worth your time. **JR**

AMD Athlon II X2 255

	X2 255	200x15.5; DDR3-1333 7-7-7-21	217x15.5; DDR3- 1446 7-7-7-21	230x15.5; DDR3-1532 7-7-7-21
PiFast	36.63s	34.02s	32.09s	
wPrime 32M – single thread	48.719s	44.444s	41.512s	
wPrime 32M – multi-thread	24.616s (1.98x efficiency)	22.448s (1.98x)	20.951s (1.98x)	
CineBench R10 64-bit – single thread	3530	3806	4032	
CineBench R10 64-bit – multi-thread	6815 (1.93x efficiency)	7269 (1.91x)	7668 (1.90x)	
Everest Read	8601MB/s	9199MB/s	9603MB/s	
Everest Write	7235MB/s	7834MB/s	8290MB/s	
Everest Latency	49.5ns	46.1ns	44.0ns	



GIGABYTE 890FXA-UD7

Almost not slightly like what we already had. Almost.

Street Price \$320 Supplier GIGABYTE

Website www.gigabyte.com.au

Specifications Socket AM3; AMD 890FX chipset; EATX form factor; 6x PCIe x16 (2x16, 2x8, 2x4); 1x PCI; 6x SATA3, 2xSATA2; 2xUSB3; DDR3-1866+

Enthusiasts are an undeniably picky bunch. Not only do companies have to get the right features packed into the products that we're clamouring for, but they've also gotta be able to do it across their entire range from top to bottom – and as our Atomican's Choice awards prove, GIGABYTE is not a stranger to making reliable motherboards. This model is based around AMD's highest-end chipset, the 890FX, but the UD7 annotation suggests that it's amongst the highest echelons of products that come from the GIGABYTE factories, and this is definitely made very clear, even from when you first open the box.

Lying in its own plastic shell is Big G's latest attempt at giving motherboard cooling a boost; the Silent Pipe. A silly name belies its true purpose, and the Silent Pipe screws onto the 890FX chipset's existing heatsink base, extending the cooling capacity with two more heatpipes and a hellish increase in sheer surface area. By installing the Silent Pipe we had to first remove the pre-existing waterblock; but this wasn't a loss in any way, since the waterblock is barely 1cm thick, and wouldn't do a very good job in the real world. It'd sure look pretty though!

The I/O panel on the 890FXA-UD7 is an area where a distinction was made between the low-end boards and the high-end, but is now simply an echo of the lower models. Consisting of the same ports we've come to expect from a motherboard, this one throws in an extra Gigabit Ethernet port just for the hell of it, alongside two flavours of Firewire and two hybrid eSATA/USB ports for good measure.

Audio needs are provided by a now-standard (which is another way of saying boring) Realtek

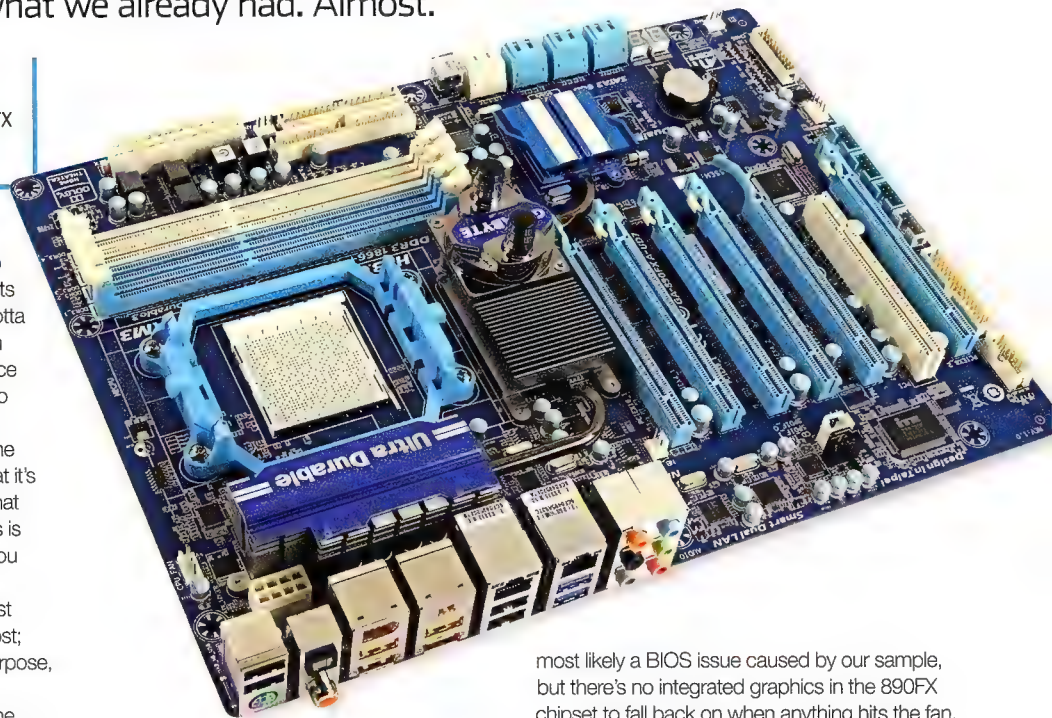
ALC889 chip, and the tireless engineers in the mobo division are *still* putting the damn front panel audio header in the middle of the board. Sure, our whining ain't gonna change it, but it's still annoying!

The largest and most obvious feature of this board is the six 16x PCIe slots, which some would guess allow a huge amount of graphics cards. Well, not quite, since there are two 16x, two 8x and two 4x electrically – so at most you'll run four cards, most likely at reduced 8x speeds. We also found that the PCIe slots were a little quirky under testing, with all but the lowermost slot refusing to let the graphics card output an image. POST seemed fine thanks to the LED screen onboard, but it's still concerning. This is

most likely a BIOS issue caused by our sample, but there's no integrated graphics in the 890FX chipset to fall back on when anything hits the fan.

Performance was nice, if underwhelming at stock speeds when compared to the ASUS M4A89GD-PRO, but it was leaps and bounds over the GIGABYTE 890GX-based board we looked at a few issues ago. Thankfully for GIGABYTE, the UD7 pulls in front of the competition in PiFast and memory bandwidth tests, though it's pipped to the punch in both Cinebench and wPrime.

Overclocking resulted in a decent speed of 3760MHz at 235x16, but it wasn't amazing. Overall this is a board that tries to pull itself above the crowd, and superficially it achieves that, but realistically it's not worth the expense. **JR**



GIGABYTE 890FXA-UD7

	X4 955 200x16; DDR3-1333 7-7-7-21	217x16; DDR3-1446 7-7-7-21	230x16; DDR3-1532 7-7-7-21
PiFast	33.98s	31.32s	29.44s
wPrime 32M – single thread	45.224s	42.026s	39.235s
wPrime 32M – multi-thread	15.847s (3.88x efficiency)	11.123s (3.83x)	10.482s (3.70x)
CineBench R10 64-bit – single thread	3557	3790	4056
CineBench R10 64-bit – multi-thread	12628 (3.55x efficiency)	14212 (3.75x)	15106 (3.72x)
Everest Read	8236MB/s	8802MB/s	9416MB/s
Everest Write	6760MB/s	7335MB/s	7770MB/s
Everest Latency	53.4ns	49.7ns	47.5ns

Performance

It's okay, but the 890FX should push further.

81

Value

Expensive for what you get.

72

Features

Plenty of features, but not many premium ones.

84

Build

Decent, though PCIe quirks bring it back a little.

79

Overall

An interesting, if average board.

80%

ASUS Maximus III Extreme

Overwhelm your acknowledgement with wireless overclocking experience!

Street Price \$485 Supplier ASUS

Website www.asus.com

Specifications: Socket LGA1156; Intel P55 chipset; NVIDIA NF200; ATX form factor; 5x PCIe x16; 1x PCI; 7x SATA2, 2x SATA3; 2x USB3; DDR3-1866+

Such is the kingdom of motherboard manufacturers based in Taiwan that translation awkwardness gets in the way of what is otherwise an interesting feature. The above overwhelming acknowledgement is a quote verbatim from the product page for the Maximus III, and it makes us giggle like schoolgirls! But the real story isn't the amusing descriptions for features, but rather this new high-end P55 board.

ASUS is pretty experienced with this chipset, and with experience comes knowledge of limitations – namely, the PCIe lanes are so scarce as to be classified endangered. ASUS has worked around this by throwing one of NVIDIA's NF200 chips into the mix, giving Crossfire and SLI dual 16x bandwidth or three-way bandwidth at dual 16x with the third card at 8x. Arguably you'd just look to the X58 platform if you're after either multi-gpu technology, but hey, you've got choice now. There are also two molex connectors near the PCIe slots to boost electrical input and aid stability.

The usual I/O features are displayed on this board, with USB3 making a showing again as the must-have fashion of the season, though ASUS has also thrown in an optional Bluetooth module. This module (coincidentally described above) performs the same function as the ROG Connect USB cable, and allows basic tweaking of BCLK frequencies and voltage from an external lappy. Not exactly a must-have feature, but you can also use it as just a normal Bluetooth interface, so it's welcome.

The LGA1156 socket is treated to a digital VRM, the same as with ASUS' entire range of high end boards, which delivered stable power to the CPU that wavered slightly under

overclocked load. The memory slots also support speedy sticks, and have their own power delivery system. This edge of the board also boasts the Probelit panel of hard voltage measurement points for essential components, giving easy feedback for overclockers with access to a multimeter.

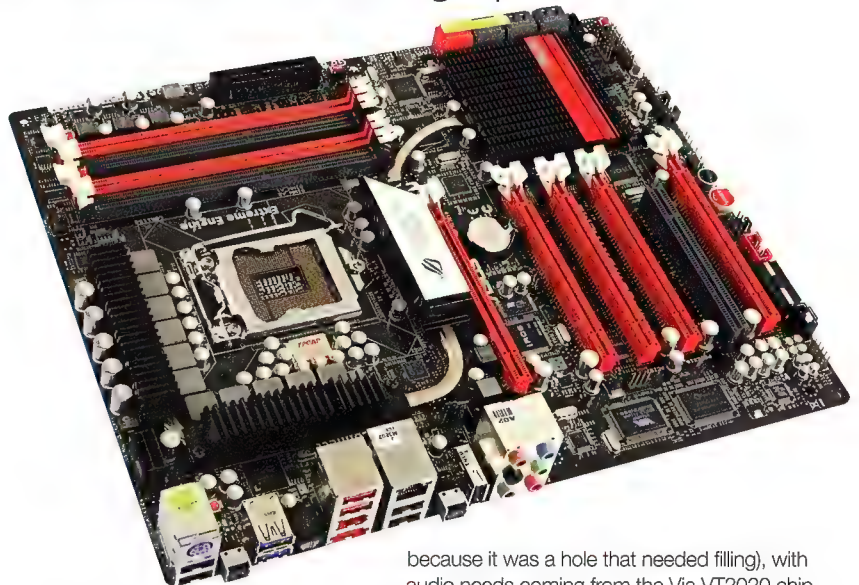
Storage inputs cover seven SATA2 ports, six from the P55 Express chipset and the final one from a JMicron controller. The controller's second port is piped to the I/O panel for eSATA duties. Also here is the Marvell SATA3 controller that has seen use in every board we've looked at for the past few issues, giving two SATA3 ports. The chip interfaces with a PLX bridge chip to boost PCIe lane bandwidth. IDE and Floppy are nowhere to be seen, but are not really missed.

Hard power and reset buttons make a showing along the bottom edge of the board, which are very handy when overclocking outside a case, and the five PCIe slots have plenty of room between them. There's a single PCI slot for backwards compatibility (and we imagine just

because it was a hole that needed filling), with audio needs coming from the Via VT2020 chip.

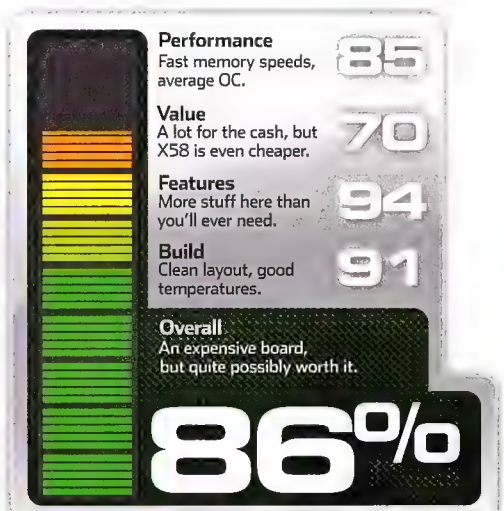
Stock performance was a mixed bag, giving us very good memory bandwidth and latency that led to a very fast PiFast score, though the performance seemed to lose some of its edge as we overclocked higher. The maximum overclock we garnered was 4180MHz at 190x22 with 1.54375V, missing out on the 200+MHz potential we know the chip has, as seen with MSI's Big Bang Fuzion board.

Also slightly disappointing is the cost, rocking in at almost five hundred wingwangs. All the added chips (NF200, PLX, Marvell, NEC, Bluetooth to name a few) add up to be very expensive, and the digital VRMs aren't cheap either, bumping this board pretty high. For the price, this isn't really so attractive, but you won't see many more features packed into the P55 platform.



ASUS Maximus III Extreme

	7 870	133x22; DDR3-1600 8-8-8-24	150x22; DDR3-1500 8-8-8-24	175x22; DDR3-1400 8-8-8-24
PiFast		24.26s	24.10s	22.67s
wPrime 32M – single thread		36.674s	36.224s	33.926s
wPrime 32M – multi-thread		8.175s (4.49x efficiency)	7.208s (5.03x)	6.82s (4.97x)
CineBench R10 64-bit – single thread		4858	5114	5482
CineBench R10 64-bit – multi-thread		18579 (3.82x efficiency)	20790 (4.07x)	22574 (4.00x)
Everest Read		16634MB/s	15470MB/s	15582MB/s
Everest Write		10910MB/s	12240MB/s	14143MB/s
Everest Latency		46.5ns	45.5ns	44.3ns



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Sapphire 5850 Toxic Edition

A totally custom-built 5-series card with a serious punch.

Street Price \$430 Supplier Sapphire

Website www.sapphiretech.com

Specifications 765MHz core; 1125MHz memory (4500 effective); RV870 core; 1440 shader units; 1024MB GDDR5; 256-bit memory interface; dual slot PCB with active cooling; dual 6-pin PCIe power connector

Card info www.techpowerup.com/gpuz/68xz3

While this isn't the full-sized RV870 core (that would otherwise boast 1600 shader units), the 5850 Toxic boasts a pretty high total of 1440 units running at an increased factory overclock from reference clocks (725/1000) that bring it 40MHz higher to 765MHz on the core and 25MHz higher to 1125MHz for the memory. There's still 1GB of GDDR5 used on a 256-bit memory bus, but the heightened clocks make up for some of the difference between this card and the faster 5870 cards.

Not only have the clocks been tweaked slightly from reference, but the entire PCB has undergone a total reworking. Sapphire's engineers have added an extra inch or so to the length of the card, making it almost as long as a 5870 – while it's not quite there, the PCIe power connectors extend it much further. This means that the Toxic isn't going to be quite as well-behaved in smaller cases that would otherwise fit the 5870, due to its vertical power connectors, and is something to keep in mind. The lengthening of the PCB is justified with the addition of plenty of power-providing components, as well as smarter spacing between heat-generating areas.

The redesign has also made way for Sapphire's Vapor-X heatsink, an aftermarket custom design that actually looks pretty badass. Completely removed from the reference black-

and-red matte plastic design, the external shroud mixes glossy black-and-blue plastic with a large centrally mounted intake fan and a blue PCB. While this also means that it doesn't exhaust entirely out the rear of the chassis (and instead most of the heat enters the case), it shouldn't be much of a problem with decent airflow. The larger fan also generates much less noise compared to the reference 5850 cooler; the 52dBA at idle is similar, but a load noise of 57.1dBA is markedly quieter. Temperatures sit at 35 while idling, though they're not as great as we'd hoped at a load of 60.

The Toxic also supports three digital outputs from a total of four connectors, boasting DisplayPort, HDMI and two DVI plugs alongside



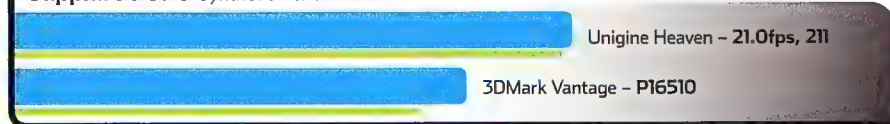
the usual teensy exhaust vent. Crossfire is possible via two nipples at the top of the card.

Overclocking was an interesting affair, with the card powering through our tests at a heightened rate of 900MHz on the core. This represents an additional 18 per cent overclock, and if it were clocked at reference speeds it'd be 24! Unfortunately, while the core did quite well we didn't see any movement on the memory side at all.

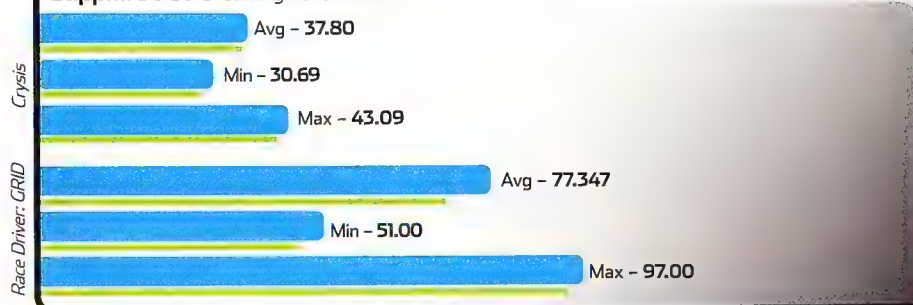
Performance is pretty great for a 5850, coming in noticeably higher than the reference 5850 in all tests and only slightly behind the 5870. The difference between these cards is slight, but the Toxic draws a middle ground that gives more than playable frames.

The 5850 is a great choice for any gaming system, and the Toxic proves again that you can take an existing design and make it even better. It's quiet, speedy and colourful; and really, that's all a fast card needs to be. **5** JR

Sapphire 5850 Synthetic Benchmarks



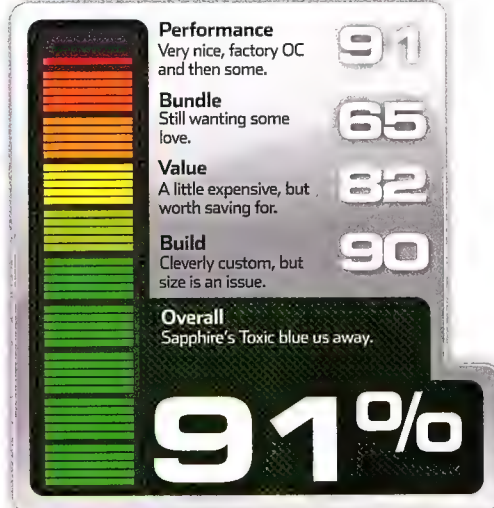
Sapphire 5850 Gaming Benchmarks



= Reference scores: XFX 5850

Frames per second

atomic



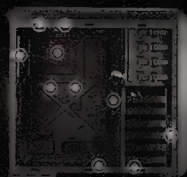


PERFORM IN STYLE



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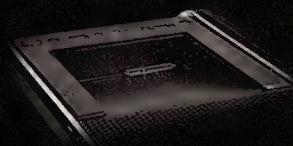
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EVGA GTX480

The first retail Fermi card, plus full SLI testing!

Street Price \$765 Supplier EVGA
Website www.evga.com

Specifications 701MHz core; 924MHz memory (3696MHz effective); 1401MHz shader; GF100 'Fermi' core; 480 CUDA Cores; 1.5GB GDDR5; 384-bit memory interface; dual slot PCB with active cooling; 6-pin, 8-pin power connector

Card info www.techpowerup.com/gpuz/er7z5



Get on with it!

Okay, okay, we hear you!

The GTX480 is definitely the blue whale of the graphical ocean, and it rocks in at a huge weight of 930g. To protect this hefty card during shipping, EVGA carved out a single block of foam and gently nestled the card within, leaving just enough room for a window in the cardboard box that peeks through to the rear of the PCB; giving a look at...the barcode. Still, at least you can make sure the card in the box is the right one! Rounding out the box is a mini-HDMI to full HDMI cable, allowing full use of all the display capability of the card, that also offers two DVI connectors. While there isn't a game included in the pack, there is a disc included that contains some tech demos.

The card itself is essentially the same as NVIDIA's reference design, sporting the same crazy design and bugbears. Externally it is composed of a large black plastic shroud that guides the cool air sucked into the card and passes it through to be dumped out the back of the chassis. This is made easier by the expansion bracket's extra-large vent; over twice the size of the 5870. The large metal

plate with raised bumps does more than just look like a Klingon's forehead, and rather effectively provides a large surface area where heat can be radiated from the guts within. This 'radiator' is soldered directly to a mass of internal fins, which all converge in a single large block of nickel-plated aluminium. There are five thick heatpipes that act as the base of this impressive heatsink, machined flat to contact the heat source directly and pump it throughout the heatsink more effectively – making a detour outside the top edge of the card for some momentary cool air. Air intake duties are provided by a single Delta fan, running at a maximum amperage of 1.8A, and translating into an uncomfortably ear-bursting 87.2dBA of noise when cranked up to 100 per cent. Temperatures at idle were a cool 42 degrees at a not-terrible 57.9dBA, though load hit a top of 88 degrees at a distracting 71.3dBA, measured from the intake fan.

To build such a heatsink without a need for it would be rather impractical, but the sole reason behind it is also the most attractive part of the card – the GF100 core. Packing three billion transistors into a chip that measures 529mm², there are a total of 480 CUDA Cores active within the GTX480, residing within fifteen Streaming Multiprocessors. While we've gone over the Fermi architecture time and time again, this boils down to a core that is almost fully functional – the final sixteenth piece notwithstanding. The stock clocks sit at 701MHz for the core and 924MHz for the memory. Due to the GDDR5 memory used this generates an effective speed of 3696MHz, and the 384-bit memory bus throws itself into the mix to give a final memory bandwidth of 177.4GB/s. In other words, more capacity than your average glutton has for hors d'oeuvres.

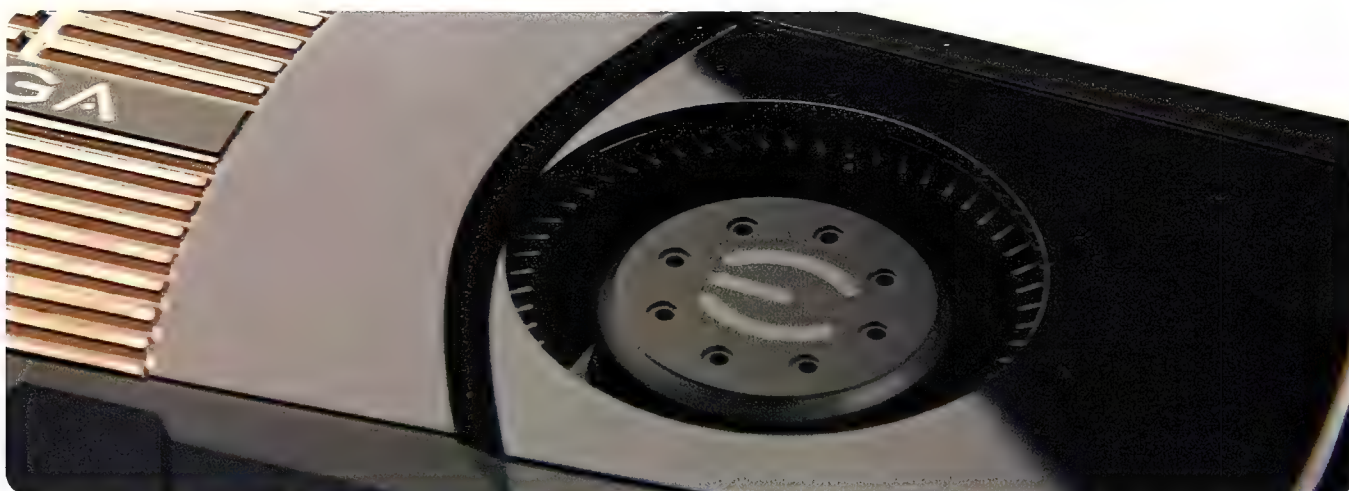
Amazingly, even though the card runs much hotter than the internal frame of a fusion reactor, it's also very overclockable. While none of the other overclocking tools are compatible with the GTX480 just yet,

The GTX480 cards are finally trickling through and reaching the Atomic Labs, and though there's been a significant time since launch already, they're still in short supply. At time of writing, a look at any given retailer will give you a nice list of cards from ASUS, Gigabyte, Galaxy and of course, EVGA. However, next to each of these will inevitably be a large 'NO STOCK' label; and the very few places that have stock, won't have it for long. This problem is exemplified by the description for one card on popular retailer's site, PC Case Gear, that reads "Direct deposit orders not accepted as stock will most likely sell out before payment clears".

Before we launch into the meat and potatoes of the review, let's explain what that means: if you've got a hankering for some GTX480 love, the odds are *overwhelmingly stacked against you actually getting your hands on one*, let alone getting more than one. The problem was big enough to spur NVIDIA's CEO to comment on the issue (online at www.atomicmpc.com.au/?172227). You're more likely to drink a bunch of chemicals and poop out a fully-formed stretch limo than you are to grab one of these puppies! By the time you read this, of course, the problem may have gone the way of the dodo and the telephone switchboard attendant, and the market might be inundated with the cards. Not too likely, though.

But assuming the planets are in the correct house and you actually get one of these cards, here's what you can expect.





EVGA supplied the latest build of its Precision tool (1.9.2), and we were able to eke out a marked increase of 19 per cent on the core clocks (+136MHz) and an additional ten per cent for memory clocks (+91MHz). Technically, this card is certainly impressive, but how does it stack up performance-wise?

Single-card performance

Throwing EVGA's GTX480 into our testbed (an X58-based ASUS Rampage II Extreme, Intel Core i7 965 at 3.2GHz, 6GB of Corsair DDR3) we booted up our benchmarks and sat down to give this card a rattling. First off the rack is 3DMark Vantage, a synthetic benchmark that provides an easy comparison between NVIDIA-based cards – but keep in mind that PhysX is used for the CPU score, so it's a little skewed. Just like last month, we see an improvement over the competing ATI 5870, though the difference isn't very significant when the skew comes into the picture. Unigine's Heaven benchmark is also faster than the

5870 when tessellation is enabled; though when disabled, ATI cards pull ahead noticeably. Since tessellation is a DX11-specific feature that doesn't see widespread use (yet), it's not a huge must-have. Performance in GRID is pretty great, averaging five frames a second faster than the competition, but this is practically unnoticeable in the vast majority of cases.

As you can see in the table, this card gives a very noticeable performance increase when overclocked in both Crysis and 3DMark Vantage that averaged roughly 13 per cent, which was almost in line with the core clock increase. Performance again increased slightly when the CPU was overclocked to 3.736GHz, but not by a large margin.

Single-card performance is, to be honest, quite underwhelming compared to where we hoped it'd be. For a card that is listed online at \$765, it's competing against a mature product with decent availability – which most importantly carries a price of five hundred dollars. The performance in this comparison isn't amazing, and we wonder exactly where that extra \$265 of value comes into it for most people. But,

being the eternally curious folks we are, we got to wondering what would happen if we had another GTX480. Would we see new levels of performance, or would it continue along this path?

Extra performance, on the SLI

Up to this point we haven't shared much new performance information on the GTX480 – overclocking aside – but thanks to the amazingly helpful team at EVGA we were able to source a second GTX480 card. While having two identical things doesn't always help a system like the human body (like two left feet), two of these babies help a computing system a lot, and they give us the ability to run them concurrently with what NVIDIA lovingly call SLI, or Scalable Link Interface. What that means, well, it's explained in the name, but it's the equivalent of strapping another V8 engine to your existing V8, and getting more performance.

You'll need to have a few ingredients to get the two engines playing with each other nicely however; an SLI-capable motherboard, an SLI connector, a case with plenty of room, a beefy power supply and plenty of airflow. SLI is technically possible to achieve through software and the PCIe bus alone, but performance is generally pretty shocking, so the SLI connector is required to give an extra 1GB/s link through which synchronisation data can flow, while the other ingredients are just common sense. Power needs for two of these cards are serious

Overclocked performance (relative to stock)

	3DMark Vantage	Crysis Avg	Crysis Min	Crysis Max
EVGA GTX480	P23746 (+2898)	49.24 (+5.63)	36.3 (+1.59)	58.41 (+6.7)
EVGA GTX480 OC/CPU	P23553 (+2705)	49.39 (+5.78)	38.87 (+4.16)	58.69 (+6.98)
GTX480 SLI	P34434 (+2973)	71.28 (+0.50)	23.8 (-18.86)	90.65 (+5.12)
GTX480 SLI OC/CPU	P35507 (+4046)	75.75 (+4.97)	45.88 (+3.22)	92.48 (+6.95)

Results comparison table (relative to GTX480)

	3DMark Vantage	Crysis Avg	Crysis Min	Crysis Max	Unigine Heaven FPS	Unigine Heaven Score	Unigine Heaven no tess FPS	Unigine no tess Heaven Score
EVGA GTX480	P20848	43.61	34.71	51.71	27.8	700	33.6	847
HD5870	P18606 (-11%)	43.09 (-1%)	34.9 (0%)	49.54 (-0.5%)	24.6 (-12%)	619 (-12%)	34.5 (+3%)	869 (+3%)
GTX480 SLI	P31461 (+51%)	70.78 (+62%)	42.66 (+23%)	85.53 (+65%)	53.8 (+94%)	1354 (+94%)	64.1 (+91%)	1616 (+91%)
HD5970 relative to SLI	P22974 (-27%)	48.17 (-32%)	34.88 (-18%)	64.09 (-25%)	35.9 (-33%)	905 (-33%)	48.5 (-24%)	1221 (-24%)

business, and as each GTX480 card sports a maximum TDP of 250W along the CPU's 130W and other various system components, you'll want a power supply that can handle the load. With everything in place, we SLI'd the hell out of these two cards.

Wrestling the cards

Quite frankly, the heat that these two cards generate is insane. With 250W of theoretical heat output per card, we're playing with more heat here than your average 60-inch plasma TV will make, all concentrated into a comparably tiny volume of space. Temperatures of the primary card sat at 56 degrees when idling thanks to the starvation of the intake fan by the secondary card, and loads rocketed to 90 degrees. The design of the heatsink's radiator is certainly novel and effective in a single-card situation; but when in SLI, this heat is simply dumped into the rear of the secondary card's core. While this didn't make much difference at idle, with the secondary card sitting at 46 degrees, load temperatures soared to 94 degrees – aided by the primary card's heat output. The heat wasn't constrained to the cards themselves, either, and even the rear I/O ports of the motherboard heated up significantly when the two cards were left under high loads for twenty minutes, even more surprising as they were run in an open-air testbed.

A single card is noisy, and in the testbed we noticed the fan speed hit 66 per cent. With two cards, we measured instead from the top of the cards, as what would be the audible amount of noise that the case would have to contain. Idle was definitely noticeable at 52.6dBA, but it was a load volume of 72.8dBA – generated from the 80+ per cent fan speed – that proves SLIed GTX480s are never, ever, ever going to be a quiet option under air cooling.

But even though the cards demand a significant amount of power and cooling, the single most astounding result of testing was the scalability of GTX480 cards in SLI. The 3DMark



Vantage score alone rises by 51 per cent with the addition of a second card; average frames in Crysis rise by a whopping 62 per cent; and regardless of tessellation, Unigine's scores reach mind-blowing levels of *over ninety per cent!* While we only saw such a fantastic increase in this one engine, these results hint at an incredibly mature driver and an engineering team who have every frackin' facet of their technology nailed *exactly* where they should be. In fact, performance in SLI was so impressive that it was one of the very few moments we actually gasped – and that does not happen often.

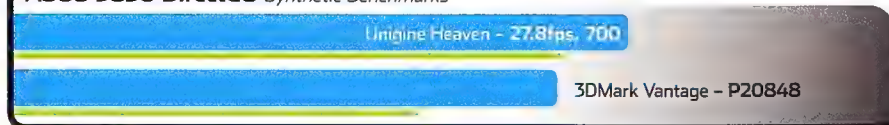
Surprisingly, even though each card was packed so close there was less than a centimetre of space between them; we still managed to get a nice overclock out of both cards. Core clocks increased by fifteen per cent to 804MHz (+103MHz) and memory clocks increased seven per cent to 991MHz (+67MHz). We ran these clocks under MSI's Kombustor tool at 1920x1200, OpenGL 3.2, Xtreme burn and 8xAA, and they ran at these clocks for an hour – at a constant temperature of well over 90 degrees. Performance increased under these settings, as seen in the table, but with the CPU left at stock speeds we didn't see much

of an increase in gaming performance. Crysis actually went slightly backwards! However, once we increased the speed of the CPU to 3.736GHz we unlocked what we were hoping for, proving – yet again – that the processor is the main bottleneck when dealing with high-end graphics cards, even in such a modern system. Unfortunately, a huge amount of airflow is demanded for a large overclock to work in a case environment, but it's certainly achievable.

Means to an end?

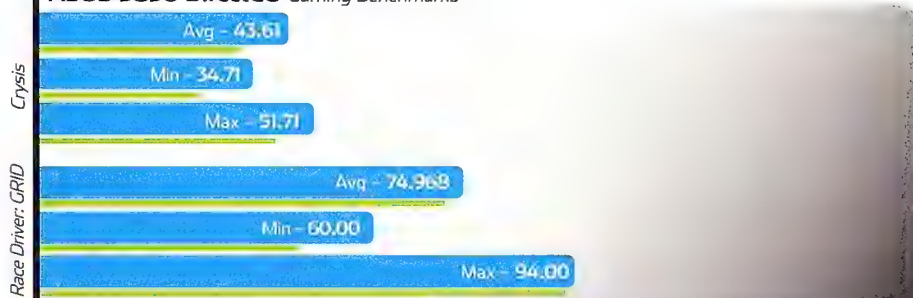
SLI is not for everyone. Shocking, we know, but it's simply not going to be something that the vast majority of the computing world will get to use. The admission price on the ticket totals \$1530 – and that's just purely for graphics cards, not including everything else you'll need to support them. But at the end of the day, is all this effort justified? Add up the unmatched performance with overclockability, support for every software package that supports CUDA or PhysX (a no-brainer for content developers out there), and the elite status that comes from having not one but two cards, and the answer is clearly an enthusiastic yes. And if nothing else, it sets that ever-tempting performance bar just a little bit higher. **JR**

ASUS 5830 DirectCU Synthetic Benchmarks



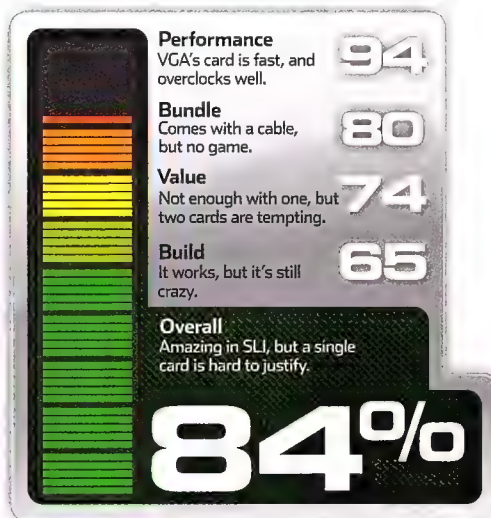
Score

ASUS 5830 DirectCU Gaming Benchmarks



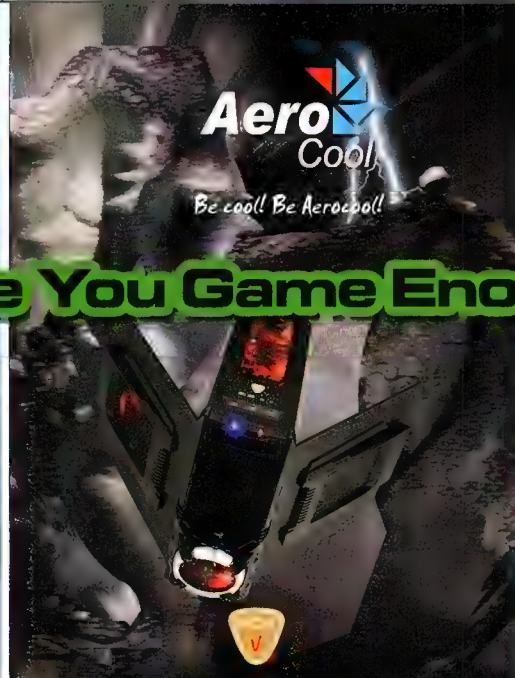
= Reference scores: XFX 5850

Frames per second





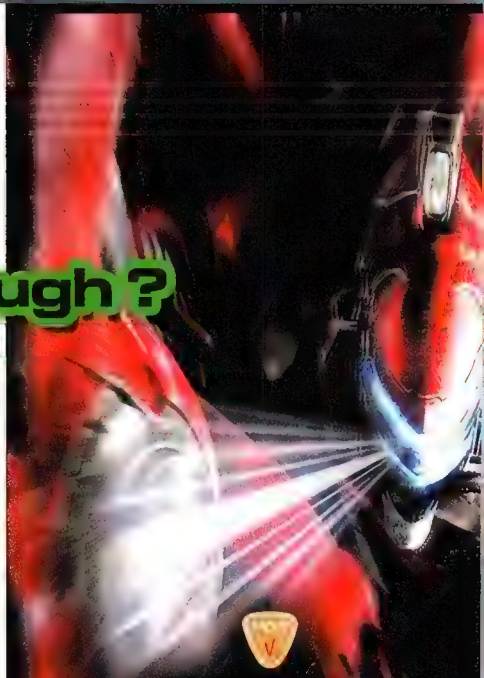
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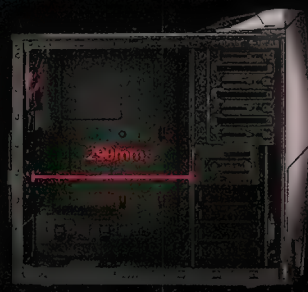
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GIGABYTE GTX470

A card that we really want to like.

Street Price \$570 Supplier GIGABYTE

Website www.gigabyte.com.au

Specifications 607MHz core; 837MHz memory (3448MHz effective); 1215MHz shader; GF100 'Fermi' core; 448 CUDA Cores; 1.28GB GDDR5; 320-bit memory interface; dual slot PCB with active cooling; dual 6-pin power connector

Card info www.techpowerup.com/gpuz/h5heh



So we looked at Fermi last month with our look at NVIDIA's GTX480, and found it to be a mixed bag with more variety than a fruit salad with random nuts thrown in. We've finally got our hands on the GTX470 card from GIGABYTE, and though it doesn't offer anything special like aftermarket heatsinks or games, it's still gonna be a port of call for a lot of people. It's the not-quite-top-end of NVIDIA's new wave of DX11 cards, so let's have a look at the specs.

In terms of processing power the GTX470 offers only 14 of the total 16 Streaming Multiprocessors that the GF100 die physically

has, giving it a total of 448 CUDA Cores, otherwise known as shader units. These Cores run at a much slower stock speed of 607MHz, and unlike previous NVIDIA cards, the shader clocks are linked permanently to the core clock at a 1:2 ratio; as you overclock the core, you'll inadvertently overclock the shaders too. Memory capacity is an impressive 1280MB of GDDR5 running on a wide 320-bit memory bus, though is disappointingly clocked at an effective 3448MHz.

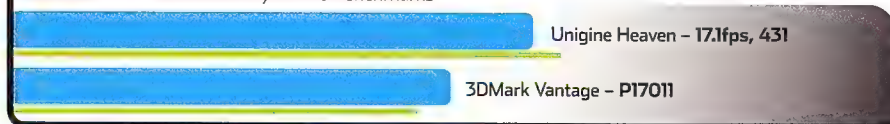
Thanks to this slowdown on both Cores and clocks, the power consumption of the card is significantly lower when compared to the GTX480 – sitting 35W lower at 215W. This may not sound like much, but it's just enough to remove the need for the gigantic (and quite frankly, ridiculous) radiating plate of the higher-end model, and give the card a relatively normal appearance. Cooling is performed by an aluminium-finned five-heatpiped heatsink kept within the black shroud, and even though it has a lower TDP, temps remain disappointingly high. The GTX470 idles at 47 while generating 55.4dBA of noise; load becomes a little silly,

with temps of 87 degrees and a volume of 68.6dBA. This is nowhere near quiet, and has a similar 'space heater' effect as the hotter model. But hey, winter is coming soon, so this might be attractive to you!

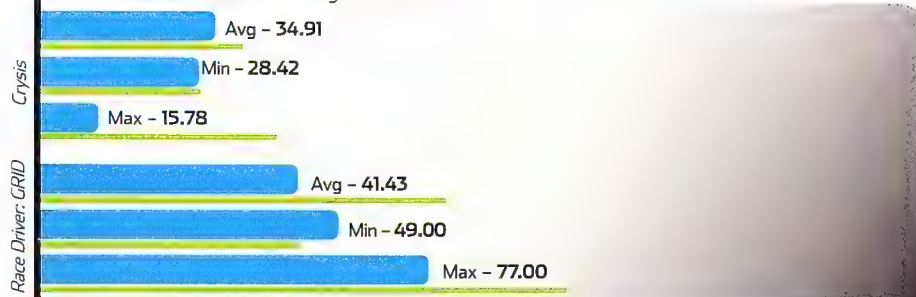
Overclocking wasn't possible at time of writing thanks to existing overclocking tools not understanding what to do with Fermi: they could sometimes change memory clocks, but core clocks wouldn't stick, or even read correctly. GPUz 0.4.2 read the clocks correctly, but ultimately just told us what we already knew. This will be fixed in the coming weeks as tools are updated, so expect overclocking results to be included in the future.

Performance in games is pretty solid, benchmarking faster than the 5850 across every benchmark result – though it's beaten by the 5870. Vantage scores seem impressive until PhysX acceleration is taken into account, but it's still a hard sell at this price. **CR JR**

GIGABYTE GTX470 Synthetic Benchmarks

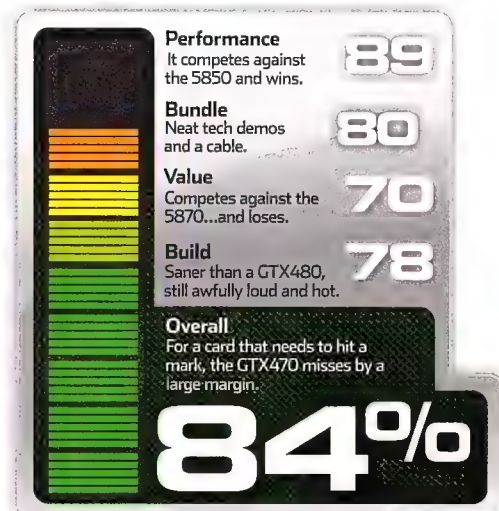


GIGABYTE GTX470 Gaming Benchmarks



= Reference scores: XFX 5850

Frames per second



Thermaltake Toughpower XT 775W

Rock-solid, reliable power.

Street Price \$200 Supplier Anyware
Website www.anyware.com.au

Specifications ATX form factor; 24-pin, 8-pin ATX, 6x molex, 8x SATA, 1x Floppy, 2x 8/6-pin PCIe, 2x 6-pin PCIe, 80+ Bronze

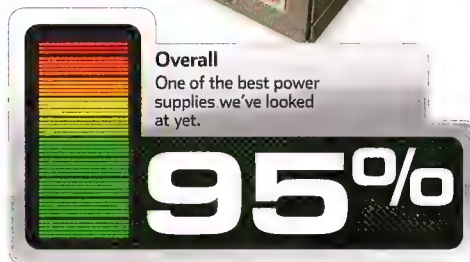
Power supplies are often the most overlooked component in a rig, and as the Atomican's Choice awards showed this very issue, they're usually quite particular about their units. While the big guns of Corsair and Antec are generally good choices, Thermaltake has reworked its range of Toughpower units and is offering them at a wallet-friendly \$200. This is pretty cheap for a modular power supply, but it doesn't skimp on much.

Encased in a love-it-or-hate-it off-green/gold case whose colour is incredibly awkward to describe, the XT uses a large 140mm fan to perform all intake and exhaust duties, with a small wedge of plastic internally to direct airflow. Under load the unit gets quite warm, blowing out a lot of warm air, but it was never hot.

Interestingly the fan continues spinning for a short while after the system shuts down, a neat touch.

All the cables you'd really need are included, with only PCIe cables sitting at a slightly small total of four. They're nicely modular, and have plenty of length to stretch across most gaps in a system. We threw together a testrig composed of two GTX480 cards and an Intel Core i7 965, running two instances of MSI's Kombustor as well as OCCT to stress the PSU, and the performance was surprising.

The 5V rail barely dipped by 0.001v when under load, from an idle of 5.148v, while the 12V rail became slightly more enthusiastic and reached a load of 12.104v, up from 12.055v. This unit hardly wavered under high stress, and performed admirably through anything we threw at it. Considering the reasonable asking price and very high performance, this is one unit that won't let you down. **JR**



Arctic Cooling Accelero TWIN TURBO Pro

BBBRRRRROOM!

Street Price \$55 Supplier Arctic Cooling
Website www.arctic-cooling.com

Specifications Graphics heatsink; 4 heatpipes; aluminium fins; dual 92mm fans included; triple-slot form factor

The Arctic Cooling Accelero TWIN TURBO Pro is not the first heatsink we've ever looked at that has a ridiculous name, but in all honesty, it's a little bit...long. While it's admirable that they thought to describe it in detail, it doesn't actually tell you what it does – throw this on a graphics card, and presto-change-o, you've got a better cooler. Or do you?

At first glance the TT Pro looks pretty serious; with two large frameless 92mm fans, four very

visible copper heatpipes, and a whole mess of aluminium fins. The fans are powered by a 4-pin PWM cable that plugs into the card's PCB, or it can be powered by an included molex adapter. Strangely while the fans have four cables, the PWM reporting is a little batshit crazy – reporting fanspeeds ranging from 4000rpm, all the way to 869,418rpm! It does ramp up and down as normal and is controllable via software, but not via PWM.

Installation was relatively complex, with the first step being removal of the stock heatsink, the cleaning of the memory chips and core (the instructions oddly recommend an eraser for the memory chips, but it didn't actually do anything helpful, just put some eraser shaving there instead!), and the addition of the heatsink. It even came with some thermal goop pre-applied! The instructions were unclear on the final steps, and we didn't use the spacers initially, but the PCB flex was pretty obvious so we went back and added them in, and all was good.



The maximum load we recorded with the TT Pro was only barely higher than reference cooler idle, and the sound peaked at only 49.9dBA – whisper quiet. For an asking price of \$55, this is worth the effort. **JR**



Arctic Cooling Accelero Twin Turbo Pro

	Idle	Load	Delta T
5870 Reference	42	71	29
ACA TT Pro	30	46	16

A-RAM Ultra II 50GB

Harness the mighty power of sand!

Street Price \$259 Supplier Altech

Website www.altech.com.au

Specifications 50GB (46.4 formatted); SATA2 interface; 2.5" form factor

There are a few schools of thought when it comes to data; some suggest you should damn well be happy with your rotating platter thank-you-very-much, while others tell you to buy a bunch of SSDs and run 'em all in RAID. A-RAM, a new player in the SSDspace, think that you should compromise between both those camps: grab a single fast SSD. A tricky balancing act, to be sure, but one that they handle pretty well.

Their Ultra II Series drives come packed with the shiny Sandforce SF-1200 controller, a huge improvement over the Indilinx controller that other drives have at their cores, alongside 50GB's worth of flash chips. This is perhaps where the value prospect becomes muddled; yes, you can get a Sandforce-based drive for under three hundred bucks, but it ain't gonna be huge. Still, 50GB should be relatively ok for most OS installs – assuming you keep all your media and games (and most likely some larger programs) on traditional rotating storage.

Performance isn't as good as the OCZ Vertex LE that uses the same controller, though it's still very respectable. Average read speeds top out at 224.0MB/s with a random access time of 0.1ms and a burst of 233.8MB/s, and when the drive is totally full of junk data – which doesn't actually take that long – performance goes backwards. Read speeds hit 201.5MB/s and burst drops to 230.1MB/s, suggesting that you'll want to keep this drive relatively free. Thankfully, it supports TRIM for auto data-cleaning, but it's still pretty constrictive.

Though spending this much on a drive mightn't make much sense to those on a budget, and indeed it'll cost you \$5.58 for each usable gigabyte of space, it's cheaper than a lot of other options. It's even a nice choice for a quiet HTPC box!

For the price, it's a great choice.  JR



Overall

Great performance and price; shame it's so small.

85%

OCZ Vertex LE 100GB

Stealing the performance crown.

Street Price \$559 Supplier OCZ

Website www.ocztechnology.com


Specifications A 100GB (93.16 formatted); SATA2 interface; 2.5in form factor

The difference between a man with an SSD and a man without is like the difference between a king and a beggar. No matter how hard you beg your mechanical harddrive to spin ever faster, you'll never be able to eke out more performance – the physical limitation is simply too great. Thankfully, the king enlisted his wizards to tackle this most important task, resulting in the gloriously speedy SSDs that we have today.

For what seems like the billionth Vertex SSD from OCZ, this 'LE' or Limited Edition drive comes with a very neat distinction that pulls it out of the crowd of Indilinx-based drives; it's powered by the Sandforce SF-1200 controller. The controller is an impressive piece of technology, with built-in wear leveling, full TRIM support and even ECC support to ensure your data is exactly as you wrote it.

It's a bloody fast performer too, with an average read speed of 223.8MB/s, random access of 0.1ms and a hefty burst speed of

246.5MB/s. While it's not the largest drive ever, coming in at only 93.16GB when formatted under NTFS, performance is the best we've seen from any SSD so far. We filled the drive with useless data until it was bursting at the seams, and noted a small though significant performance drop: a decrease to 201.5MB/s average read, strangely higher 258.1MB/s burst and a slightly slower 0.2ms random access.

It's not unusual for a drive to go backwards slightly when full, though burst speeds are curiously fast. For the blistering performance on hand it's definitely a great choice for an OS or game drive, but it's still a shame that it's so expensive.  JR



Overall

An incredibly fast SSD, though storage space is still quite small.

90%

Kingston HyperX LoVo KHX1600C9D3LK2/4GX

It's DDR3 as we know it, but at 1.35V.

Street Price \$185 Supplier Kingston
Website www.kingston.com

Kingston is one of the more popular memory manufacturers out there, and they've been making memory long before memory was a huge consumer market. Kingston make a series of memory kits called HyperX, the company's premium overclocking sticks but we were sent something called LoVo. It's a

weird way of showing that this kit is a low voltage DDR3 kit (and surely LV could've done the job just as well), and both sticks run at a much-lower voltage of 1.35V. Whether this realistically lowers power consumption or not, we can't say.

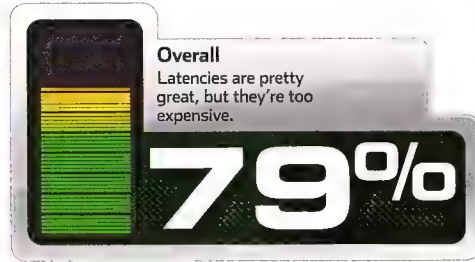
Performance with a Core i3 540 chip, one of the platforms this kit is targeted at, is not too bad, giving some nice read bandwidth and a slightly elevated write too. At the XMP settings of 1600MHz with 9-9-9-24 timings, achieved with a QPI speed of 160MHz, the latency was actually

noticeably improved compared to G.Skill's Ripjaws at 1333MHz and 7-7-7-21 timings. However, overclocking wasn't particularly amazing, and the price of this kit means that it's not a great choice – but if you want to (theoretically) save power, this is the only choice. **JR**



Kingston HyperX LoVo KHX1600C9D3LK2/4GX

	i3 540	G.Skill Ripjaws @ DDR3-1333 7-7-7-21	Kingston LoVo @ DDR3-1600 9-9-9-24
PiFast		30.0s	33.04s
wPrime 32M – multi-thread		17.503s (2.46x efficiency)	14.961s (2.46x)
Everest Read		8946MB/s	9165MB/s
Everest Write		6746MB/s	6898MB/s
Everest Latency		84.1ns	78.2ns



Razer Vespula mouse mat

A double-sided mat offers both varied performance and comfort in Razer style.

Street Price \$40 Supplier Audion MM
Website www.razer.com

A good gaming environment is just like the mise en scène that any good chef tries to have in place before they cook. Everything is just so, whether your gear is top notch, high-end stuff or just an old beige mouse on a manila folder. If you hark to the former school and like the best of everything, then choosing the right mouse mat is just as important as having the right mouse and keyboard.

Razer's new Vespula (a species of social wasps, according to Wikipedia) is a dual-sided affair with a neat non-slip surface and padded wrist rest. It's a two-part design that splits the rubbery base and actual mousing surface, and then takes advantage of having a separate surface by making it double-sided.

One side is very grippy, for a precision mousing – sniping, pin-point graphics work, etc – while the other is a smoother more slippery surface for sheer mousing speed. The theory is you can turn the mat over depending on your

gaming situation.

In practice... well, it's not going to work. You need to pick your surface before you play, because flipping the thing in a live game is a lesson in frustration. You could wait until you're dead and waiting to spawn, but it's still not an ideal solution. However, sticking with the surface that suits a game most can work. In games where you snipe more than run-n-gun, go with the grippy precision surface. If you're up close have to dodge flashbangs in CS, perhaps the faster one is for you. Neither really adds to true game performance, though – we were no more or less accurate or fast with either side, though we did *feel* more in control with the grippy side in our CoD4 testing.

The rubbery portion of the Vespula is certainly good at keeping the mat in place on your desktop, and the wrist-wrest will certainly make gaming a little more comfortable. It takes some getting used to, but if you want to avoid Gamer's Callous, this is a good option. **DH**





DEFINE R2

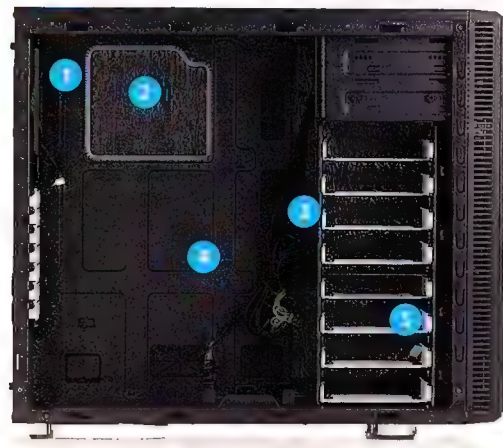
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GMC X7 X-Station

Shown in the dictionary alongside 'Redonkulous'.

Street Price \$100 **Supplier** AlsoTech
Website www.alsotech.com.au

Specifications 190 x 420 x 425mm (W x H x D); 1 x 120mm fan (front intake); 1 x 80mm fan (side intake); 1 x 120mm fan (rear exhaust); 4 x 5.25in drive bay (external); 5 x 3.5in drive bay (internal); ATX, M-ATX; Steel construction, 9.56kg

Gallery link www.atomicmpc.com.au/?169377

People, being people, have varied tastes in what they like. While you might absolutely adore that LED-studded CCFLED Christmas tree that you call a case, others might prefer a subtle approach, heading for smooth curves and understated looks. Logic would dictate that most cases fit somewhere between these two schools of thought but in this case, logic doesn't apply. GMC's X-Station is an approach that grabbed us by the crotch, poured a container of itching powder on it, and then lit our crotch on fire.

We do try to look at stuff objectively here at Atomic, but this isn't a case we can bring ourselves to like. We'll start at the front of the case, where two orange plastic reflecty strips have been randomly attached. Why are they here? What do they want from us? Why did GMC bother attaching them when they neither makes it look better, or perform a useful function?!!?

There's a ridiculously large series of vents on either side that belie reason, and they're so large that they give an uninterrupted view of the bare steel beneath. There's a 120mm intake fan behind here, but due to the gaping maw that's been slapped onto this mishmash of a front, it's able to suck up carpet fluff, hair, small animals and children without anything to stop it. To top it all off, it's made from cheap, nasty plastic.

The left-hand sidepanel isn't much improvement either, with a gigantic plastic extension that looks like an army barracks tried to mate with an industrial factory, and it doesn't look good or function well. Contained in this plastic lump is a fan controller that has either 'fast' or 'faster' speed settings, powering an 80mm intake fan whose inclusion feels token at best, and almost useless at worst. Continuing the trend of design 'features' that make us want to headbutt the nearest brick wall, there's stupid amounts of ventilation at the bottom of the panel, in the form of unfiltered pea-sized holes.

The rear of the case is plain, and probably the area of the case that we hate the least. It's an archaic design that insists on the power supply sitting at the top of the case, but at least it's got a 120mm exhaust fan. It's clumsily made from steel with a matte finish that leaves something to be desired, but at least thumbscrews hold the panels on.

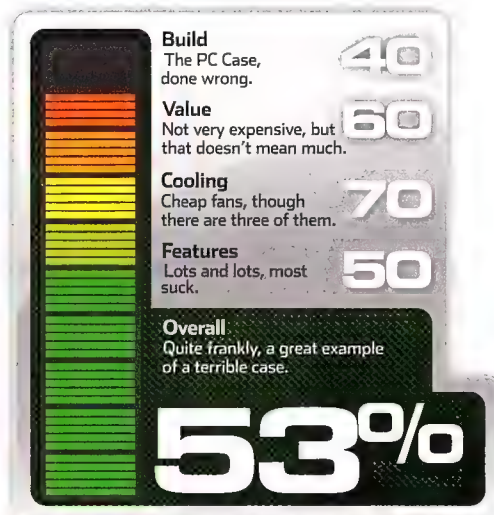
Inside the case is a cabling nightmare; though the power supply pictured is not included in the retail case, half the cabling mess is attached to the tiny LED screen that sits at the front of the unit. This screen does an admirable job of letting you know that the system is definitely running, and that the fans are at 100 per cent, but ultimately it's stuff you can actually hear and see – making it incredibly pointless. The orange glow it emits is also much too powerful, and when you add in the red and green lights dotted around the case, nothing here seems to add up



to a coherent theme.

Internally it's like being plunged back into the Dark Ages, with every toolless convenience sorely missed, and a build quality that smooths only some of the sharp edges. Our sample had what appeared to be signs of rust on the HDD cage, where the coating had failed to cover the material completely, and we also found random pieces of cardboard left inside the case.

Some might say that this case isn't *that* bad, and the asking price is only a hundred bucks. However, in the light of the immense pressure of all that failure building up, we really can't recommend this to anyone. Ever. **JR**



Sharkoon FireGlider gaming mouse

An innovative mouse from local newcomers Sharkoon.

Street Price \$35 Supplier BroNet
Website www.bronet.com.au

Specifications 7x buttons (6 programmable); DPI switch (six steps); on-board memory; weights; plastic cable.

Ah, the humble mouse. We're pretty sure that Douglas Engelbart never had the kind of gaudy, button-tastic mice we all know and use today in mind when he invented the first computer mouse back in 1963. Be that as it may, the FireGlider from Sharkoon is as colourful and packed with buttons as they come.

It's got a smooth upper surface and more or less matte lower shell, punctuated by a very grippy grooved rubber pad where your thumb will sit – well, where it would if you're a righty, anyway. There's two buttons under your thumb, the two main buttons and the scroll wheel clicks left and right as well.

Perhaps the most interesting button – at least right out of the box – is on the left-click button. It's a smaller, textured button that you can just reach if you stretch your index finger. But what does it do?

Well, in our CoD4 kill-house testing, it proved very interesting indeed – it comes pre-programmed (six of the seven buttons can be programmed by the user) to deliver three quick left-button clicks when it's depressed. In gaming terms, that's three trigger pulls, delivering some pretty good on-target accuracy, and effectively turning even a semi-automatic pistol into something with a three-round burst. Cheating? Maybe. Cool... yeah, we kinda like it.

In raw performance, the FireGlider's ultra-smooth feet offer good speed while still being accurate; we cleared the training level of CoD4 much faster than using our baseline Razer mouse. It's a little odd to hold, though; the rubber pad is very good, but the smooth right-hand side is a little harder to wield, leading to a slightly cramped grip.

However, for the price, this is a hard mouse to ignore if you're at all strapped for cash. It's programmable, features weights if that's your



kind of thing, and some really nice touches for those looking for an edge in online shooters. It's not going to beat our beloved Microsoft Sidewinder, but it's worth considering. **DH**

Overall
A great budget option with gaming flair.

83%



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Stinger Overclocked Edition

Scorptec pull out all the stops on this one...

Street Price \$5699 Supplier Scorptec
Website www.scorptec.com.au

Specifications Intel Core i7 Extreme Edition 980X @ 4.0 GHz +; Asus P6X58D Premium; Corsair Dominator 1600MHz 7-7-7-20 6GB RAM; 2x Corsair 64GB Performance SSD in RAID 0, Samsung Spinpoint F3 1TB; LG Blu-Ray Combo Drive; 2x NVIDIA GeForce GTX480 1536MB in SLI; Corsair Obsidian 800D case; Corsair H50 Self Contained Water Cooler; Corsair HX1000 1000w ATX PSU; 2x Noctua 120mm Pressure Optimised Fans (rear), 3x Noctua 120mm Impeller Fans (top); Microsoft Windows 7 Pro 64bit; Kaspersky Internet Security 2010 (new bundle since this build); SteelSeries QCK Mouse Pad



Wow.

That's pretty much what everyone in the Haymarket office said when they first laid eyes on this beast, and you humble Atomicans are no exception. It combines the awe-inspiring quality of 2001's monolith with the kind of performance that would make a Cray blush. It is in every way an object of supreme geeky desire – before you even turn it on!

Scorptec's chosen every part with performance in mind (see below), and we can barely fault any choice. The Obsidian case is

Scorptec's build

The Asus board was chosen as this is an overclocked system, with stability & reliability being absolutely paramount.

The system was shipped with NVIDIA's recent GTX480 graphics cards which have just been released, we used 2 in SLI, using the latest drivers off their website.

We decided to add in extra fans for better cooling to the Corsair Obsidian, cool air is brought in from the bottom of the case, brought up past the video cards and exhausted out the top. The Corsair H50 fans were replaced with Noctua Pressure optimised fans to drop the CPU temperature a few extra degrees. Unlike normal, the H50 is placed at the rear of the case, sucking air in, and the top fans exhausting out the hot air. Most fans are placed on either Noctua low noise adaptors or Ultra low noise adaptors to help keep the system quiet. We tried many different configurations of fans to get the best temp/sound ratio as possible. All unused SATA ports are connected, and have SATA and power going to unused drive bays for ease of installation.

a top notch performer and a case that we loved.

The matching Corsair gear, especially the Dominator RAM, is all stuff we've regularly used ourselves. And really, have a look at that spec list again. The only exception is the Corsair SSDs – we think OCZ supplies the better solid state option.

Otherwise, the Stinger is best-of-breed in just about every class.

It's also a heavy bastard, thanks to the large case and included water-cooling rig. You'll want a sturdy desk to support this, and a strong back if you like to move your system around at all. With the side off, you even see that as much care has been put into building the Stinger was put into choosing its parts. The Obsidian's to thank for that in part, being a wonderful case for cabling in, but Scorptec's builders have gone the extra mile to provide a system that we'd be hard-pressed to improve upon in terms of cable management.

This neat internal build is an absolute necessity, too, as even though the CPU is watercooled, aircooling is all that stands between the Stinger and a serious meltdown. We know from testing in this and the previous issue that the GTX 480 – Nvidia's fastest – is a hot-running card. That said, all of our testing has been external, without the advantage of the air-pressure and focused airflow of a case, so maybe Scorptec's build – with a mess of



Noctua fans – will be up to the Herculean task of keeping this rig cool and running.

Power!!!

Powering the system on, you realise two things. First off... Wow, it's fast. This is one of those instances where you can really feel the speed of the SSDs and triple-channel RAM. Everything, from opening up folders to transferring files simply feels about as smooth as it's possible to get.

The second thing you realise is that this is a very quiet system. The Noctua fans are whisper-quiet, and without a noisy CPU fan you can easily make out other components, like the Hard drives spinning up. For actual work – though, really, that's a waste of this system – the Stinger would be extremely unobtrusive.

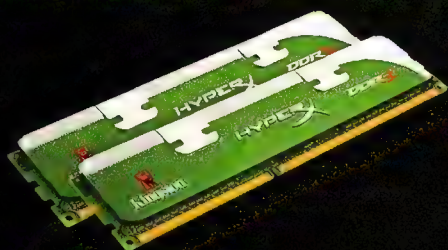
In terms of actual gaming, though... it's very obtrusive!

We started our testing with our real world Crysis benchmark, but rather than mess around with our normal settings, we followed

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a hunch and maxxed out everything. 8x AA, Very High detail settings across the board and a 1900 x 1200 resolution. We've never seen anything that hasn't found this to be at least partly challenging... until now.

As the Stinger started to whine like a server room, the frames started to flow like water. Not

only was this absolutely playable, it's without a doubt the fastest we've seen Crysis run – the Stinger managed a shade over an average FPS of 45. 30 is easily playable; this is... well, it blew us away.

That said, the system was getting very noisy – noisier than a similar system with an air-cooled CPU and 5970. It was hotter, too, with a lot of hot air venting out of the rear and top of the case. The Obsidian's side-panel window was also beginning to get very hot. So how would Vantage fair?

strain the PSU thanks to the mammoth power requirements of this machine. We ran Kombustor for, well, as long as we could.

The Stinger crashed pretty hard after only ten minutes, but not before the main GPU hit a toasty 110 degrees, in the process warping the Perspex case-window, turning the matt power cables leading into the 480s glossy and brittle, and almost melting the USB and other cables behind the machine. Even in our large and open gaming area, this thing was uncomfortable to be near for more than a few

We got all six cores of the Stinger running hot, both GPUs, and even started to strain the PSU: it crashed pretty hard after only ten minutes...

Huh. Not well, it appears, crashing on the first CPU test (the one with the crashing biplanes). However, when we realised our test thumb-drive had an old version of Vantage, we updated, and things went a lot smoother.

To the tune of P36500 smoother, the single highest score we've ever seen. But that's what six overclocked cores and two Fermis get you.

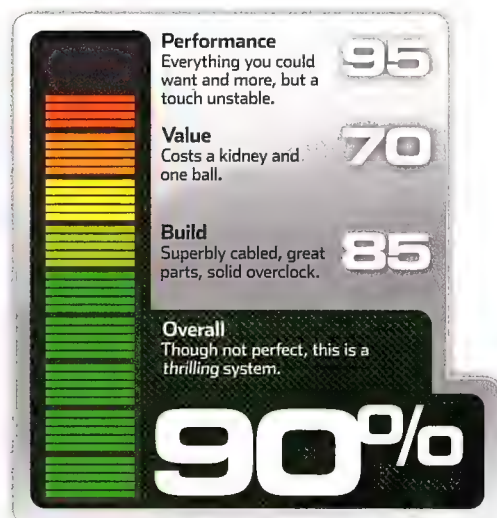
Of course, intrigued by this level of real world and synthetic performance, but increasingly worried about the rising temperature of the Stinger, we pushed it further. Kombustor is a benchmark we've recently discovered, that can stress pretty much every part of a system. We got all six cores of the Stinger running hot, both GPUs, and even started to seriously

minutes. We can't begin to imagine the effect this level of heat would have if you expect to game on for up to 20 hours each week!

And yet...

The heat, the crashing, the noise... you're probably expecting us to really dislike this system, but, oddly, the opposite is true. This system excites us – we were standing around it for hours positing what we'd do to make it run cool, or simply just imagining what percentile of a percentile simply turning this rig represents in terms of the inevitable heat-death of the universe (hint: a lot!). This is desktop computing pushed to within a millimetre of materials science – beyond even! It melts its case. MELTS! In Atomic terms, that's pretty damn awesome right there.

It's also hella expensive, we admit. More than most would be willing to spend on a system, and yeah, it's not a system that we might build for ourselves. We still think the ATI 5-series is where it's at in terms of price/performance rations, but there's no denying that Scorptec's Stinger is the crazy super-car of the computing world. **DH**





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The inaugural... ATOMICANS' CHOICE AWARDS

The best of the best in hardware, as voted and used by Atomicans just like you!
Brought to you by **David Hollingworth** and **Justin Robinson**.

There are a lot of ways to measure a piece of hardware.

In our own reviews, we use a suite of synthetic and real world benchmarks to rate each piece of kit, and combine that with our own personal expertise. We think our reviews and judgement are pretty top notch, and that if you build a system based on what we suggest in the KitLog, or based on our Hot Awards, you can't go wrong.

But there's another really useful metric – what's actually used, day-to-day, in the machines of thousands of high-end gamers and computer enthusiasts. That's what the Atomicans' Choice Awards measures: real usage by real people.

Sure, it's entirely possible that our own reviewing influences this, but there's more to

it than that. We know what brands we like, but when you get to collate results from a few thousand PCs of varying ages and uses, you start to get a feel for what the trusted brands are, and more importantly, what the most reliable tech is.

After all – can that many Atomicans be wrong?

Reading the results

A word up front – assigning winners in these Awards turned out to be tougher than we first thought. In pretty much every category, things are quite clear – both top brand and top product match up. In others, however, we found that while one brand is clearly the most trusted, because of – for instance – a wide variety in that brand (or chipset), a competitor product might actually have

more bums on seats.

This was especially prevalent in rounding up results for motherboards. So we had to then further weight results so that the truly trusted brands were properly reflected in the results.

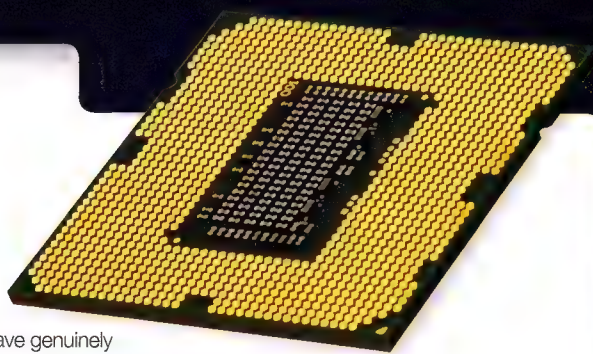
The great thing about anything like these Awards is that there is no bias – we aim to be as objective as we humanly can in our reviews, but even we have brands and products that we simply like or love. When you have a sample set this big, from a user-base that has something like a millennia or more of computing time in total, you can be sure to be getting good, solid data on the gear that is relied upon in build after build by users just like you.

So, read on to find out whose gear reigns supreme!



CPU

The powerhouse of any enthusiast PC or gaming rig.



WINNER



1. Core i7 920

2. Core 2 Quad Q6600
3. Intel Core 2 Duo E8400
4. Core i5 750
5. Intel Core 2 Duo E8500
6. Intel Core 2 Duo E6600
7. Core i7 860
8. Core 2 Quad Q9550
9. Intel Core 2 Duo E8600
10. Core i7 930

In some of our categories we have genuinely been shocked and/or amazed at some of the winning products. The CPU category, however, is not one of them.

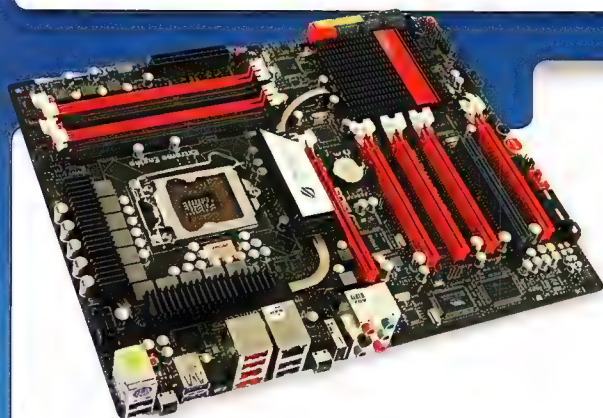
Unsurprisingly, Intel is easily the cock of the roost when it comes to the processor of choice for Atomicans. AMD did make a solid showing, but not even a single processor from our once-favourite brand has even made it into the top ten. It's truly Intel all the way.

We've always known that Atomicans respect performance above all else, and that they're early adopters of new and reliable tech – and the top choice for their processor is a perfect example of this attitude. The **Core i7 920** is a real powerhouse, and actually a few steps above our KitLog choice of the i7 870 as “the perfect enthusiast chip”. The fact that it's still a relatively new SKU, too, speaks volumes to just how well-respected the new Intel chips are – a total of four i-series chips made it into our list – even the

Core i5 is well represented.

However, to our mind, one of the real success stories in this listing is the Core 2 series, and of that family the most popular is the Core 2 Quad 6600, a massively popular chip in its day and still the number two chip of choice, and close to topping even the new i7 920 – the Core 2 range was a lightning bolt to gamers and overclockers alike, and we expect many gamers and serious enthusiasts to keep using their Core 2 Duos and Quads well into the next decade.

A chip that you could throw underneath a decent heatsink, pump up the FSB to a motherboard-friendly 333MHz and voila! Instant 3GHz chip. While we're still a little sad that AMD didn't make a more impactful showing, they've got something up their sleeves – so stay tuned. ☺



Motherboard

Which mobo makes Atomicans mad? (but in a good way...)

Wow – motherboards. This is easily the most complex and hotly contested category in these Awards, with a huge stand-off between mobo giants ASUS and Gigabyte. Back in our hundredth issue, Gigabyte took top honours as most trusted motherboard manufacturer – has it been able to hold on to that august spot? Sure has!

Gigabyte's the clear winner in terms of manufacturer, with ASUS a not quite close second. Unsurprisingly, though, the gap from number two to three is enormous. To say that there are only two real choices when it comes to motherboards is not far from the truth.

MSI just pipped EVGA to the punch with serious tenacity to come in as the number three choice, and below the four slot only a single vote or two separates the contenders.

However, we've also tried to find out what actual model of board is the top choice, but this is where things get really interesting. To keep things simple, we decided to look at not individual boards, but the series they belong to. And in that case, the most used board is the P5Q series – ASUS actually tops things here! ASUS takes both the one and two slots here, and both are P45 boards. Gigabyte does make a solid showing amongst owners of the new Core i7 range, with a goodly amount of P55 and X58 mobos coming in down the top ten list. So, since we have a clear winner in terms of mobo brand, and we need to pick a board that can support a Core i7 920, our top model choice is the **EX58-UD5**.

But a huge honourable mention to ASUS here. GG, all! ☺

WINNER

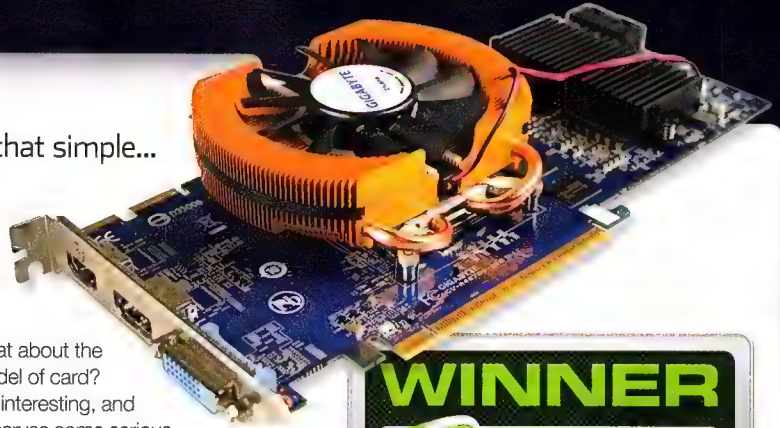


1. Gigabyte

2. ASUS
3. MSI
4. EVGA
5. Intel
6. DFI
7. Dell
8. Abit
9. Asrock
10. Acer

Video Card

Nvidia or ATI? ASUS or Gigabyte? It's not that simple...



Once again, we've got a lot of stuff to look for in this section of the Awards. Not only do we have brand and model to track, but with video cards the big question is often based around chipset – do you skew green, with Nvidia, or are your undies red, with ATI?

Only a few short years ago, it was a patently stupid question. Nvidia was the clear winner, and it's still the GPU maker of choice – but ATI is clearly coming along strong, nipping at its rivals heels, thanks to the initial success of the 4-series video cards, and now the excellent 5-series.

In terms of brand, it's a similarly tight race. Gigabyte, again, is the most trusted brand, but the margins are noticeably tighter in the video card space and the runners up positions of two, three and four were decided by a mere handful of votes. XFX is the second choice, while ASUS and Sapphire came close to tied for third.

But what about the actual model of card? This one's interesting, and Nvidia deserves some serious kudos for its 8800 range of cards taking the second slot in terms of installed hardware. It's a testament to this card's staying power that even with Nvidia on the ropes in terms of modern performance, the 8800 still rates such devotion: and for a lot of gamers, it still does everything they need! Hands-down the card most likely to be relegated to that second rig.

But the rest of the breakdown truly shows ATI's recent dominance – of all the total cards in the top ten, well over half are 4- and 5-series ATI cards, with the 4870 taking out the number one position. And there's already hundreds of 5-series cards in Atomican machines, and with the disappointingly expensive GTX400 series now on the market, we expect ATI to continue trending upward.

WINNER



CHOICE

1. Gigabyte

2. XFX
3. ASUS
4. Sapphire
5. HIS
6. MSI
7. Leadtek
8. EVGA
9. Palit
10. Gainward



RAM

Sticks and stones may break my bones, but sticks of RAM delight me!

WINNER



CHOICE

1. Corsair

2. Kingston
3. G-skill
4. OCZ
5. TeamGroup
6. Geil
7. Patriot
8. Adata
9. Crucial
10. Apacer

After the complexity of working out the winners of the video card and motherboard slots, getting to grips with the preferred RAM of the average Atomican was a breath of fresh – and simple – air.

This is mainly due to the, er, *dominance* of one particular RAM maker, and one particular range. Basically, if you want the RAM chosen by the vast majority of enthusiasts and gamers, you really want a set of **Corsair Dominators**.

See what we did that?

But seriously, Corsair have proved time and time again that they're the best at testing their memory kits well enough – not only are they reliable and stable, but they'll generally last as long as the computer will. Plus their buying power for high-end memory chips is unmatched, and if you're one of those people

with money enough to buy their special-order Dominator GTX kits, you'll be happy to know that they've all been cherry-picked for their awesomeness quotient.

Kingston and G-skill fill out the top three, and with Corsair, those brands are an order of magnitude more popular than any other brand – there are five times more installs of Corsair's sticks than the number four vendor, OCZ! This doesn't discount the effort that any vendor has put into their products, but simply indicates that brand availability is almost as important as making a good set of sticks.

So, for our representative Atomic PC, the sticks we and thousands of Atomicans recommend are Corsair's TR3X6G1866C9DF, a triple channel kit – and if you're using a dual-channel platform, like we saw online at www.atomicmpc.com.au/?167875, they're still perfect!

Power Supplies

RAW UNBRIDLED POWER!!!!!!eleventy!



WINNER



1. Corsair

2. Antec
3. Thermaltake
4. Coolermaster
5. Seasonic
6. Silverstone
7. Zalman
8. Enermax
9. Gigabyte
10. OCZ

We often wax lyrical on the necessity for a good power supply. Whether you run your gear at stock, or overclock it all to within an inch of its silicon life, a smooth supply of power is essential to consistent performance and keeping your kit in tip-top shape.

In our closest category, Atomicians have made their top choices abundantly clear. Only a handful of installs separate our winners, but at the end of the count the Atomicians' Choice Award goes to Corsair and its **HX 650 PSU**, with Antec's Truepower 650 close behind.

We're not surprised in the least at Corsair's victory; they took the PSU scene by storm with its original modular HX-620 unit, and the tantalising 5-year warranty often proves to be a deal-sealing feature.

Antec's always been a solid choice for a power supply, and while they've been unable to

match the lure of Corsair's excellent PSUs that feature in a number of our KitLog builds, the components that are used in them are nothing short of fantastic. With either, you know you're getting top-notch kit.

Interestingly, the battle for third, while distant from the top, was similarly close. Thermaltake pipped Coolermaster by the barest of margins in the end, though both are well ahead of the nearest competitors – really, if the highest-end users in the country are anything to go by, you'd be foolish to choose any other brand outside of these four top contenders. (5)

Cooling

Keeping your system stable come hell or high overclock.



Coolermaster did a wonderful job to come second in this sector, but it's really no surprise that there's only a single pair of choices for the serious computer tinkerer.

The TRUE 120 is the most popular heatsink, and the number one cooling fan belongs to Noctua.

More than any other combination (and due to the nature of this category... there are a LOT!), the **Thermalright Ultra Extreme 120** combined with a **120mm Noctua** is the one that our readers rely upon. And you know what? We don't blame them.

The TRUE has been pretty much the gold standard in heatsinks for years, and we've always liked Noctua's serious no-nonsense approach to keeping a rig cool under even the most trying of conditions, and most extreme of overclocks. Even we rely on the TRUE to keep our home machines cool, and it's usually the one component that survives every single upgrade and rebuild. It's that good.

Zalman and Thermaltake make a good showing of things, too, but everyone else is very much an also-ran in the great scheme of things. (5)

WINNER



1. Thermalright

2. Noctua
3. Coolermaster
4. Zalman
5. Thermaltake
6. Swiftech
7. Antec
8. Scythe
9. Xigmatek
10. Arctic Cooling

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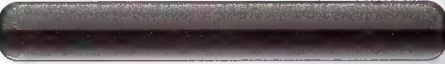


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On/off Charge is supported by 40 GIGABYTE motherboards across the range!

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ON/OFF Charge USB Port

Quick Charge	PC Power	Working	Standby	Suspend to RAM	Suspend to DISK	Shutdown	Charge time (Lower is Better)
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GIGABYTE ON/OFF Charge		Yes	Yes	Yes	Yes*	Yes*	 Up to 40% Faster
Traditional Design		No	No	No	No	No	



*Due to certain mobile phone limitations, users may need to connect the mobile phone to their PC before the PC enters S4/S5 mode to enable a quick charge from non ON/OFF Charge USB ports. Charging results may vary by model.

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PC Cases

That thing you put your stuff in...

WINNER



1. Antec

2. Cooler Master

3. Thermaltake

4. Lian Li

5. Silverstone

6. Gigabyte

7. NZXT

8. Asus

9. Corsair

10. Ayrwn

They say you should never judge a book by its cover, but there are some cases where first impressions are important. A gamer's rig is one of those.

When you put so much time and effort into building, maintaining, upgrading and overclocking your system, you want a case that's not only going to support all that power by keeping it cool and safe, but you also want something that's going to reflect your personal aesthetic.

We once again have a clear winner in terms of brand – Antec – however, the actual make of case is split almost down the middle, and between two very different cases.

On the one hand, the **Antec P180** obviously appeals for its clean lines and incredible sound-proofing. It's a case we've always liked, and Atomic's own Deputy has been housing various rigs in one for years. It's a breeze to cable, with a lot of clever internal



features. And it really is super quiet.

But the other choice of the discerning Atomican is **Antec Nine Hundred** case, a much more aggressively-styled number that appeals more to the gamer than the broader computer enthusiast. It's roomy, well-specced with fans, and comes with built-in lighting for that cooler-than-thou look at a LAN.

Our beloved Lian Li sits far behind in the case race, but Cooler Master's CM 690 is definitely the most dominant case, and is still a mighty fine choice that will serve enthusiasts for years of computing. (E)

Optical and Hard disk drives

You know – the places you keep or watch your prOn on or in.

A good storage sub-system is often overlooked in many PC builds, but for the serious user it's as vital to overall performance and satisfaction as the CPU or video card. You need to be able to store a lot of data (ie, games, torrents and prOn, or torrents of prOn, or fancy artwork that is essentially nothing but prOn – let's be honest), and move that data around quickly.

For many, the best storage combo these days is an SSD for the OS and a game or two, and large but fast HDD for more long term storage. It's a wonderful idea in theory, but we can now say that it's not one that the majority of enthusiasts are ready to commit to. The percentage of SSDs in use amongst Atomicans is actually surprisingly small. Of those, OCZ is definitely out on top.

In terms of HDDs, though, we have a seriously clear winner – Western Digital. **WD's Velociraptor**, at 10,000RPM is the top choice for many users, and the numbers suggest most have at least two or more drives.

The Optical drive slot also boasts a clear winner, and this accolade goes to Pioneer, specifically its **DVR 212**. LG and Asus also make a brave showing, but are way behind Pioneer's lead. (E)

WINNER



1. Pioneer

2. LG

3. Asus

4. Samsung

5. LiteOn

6. Sony

7. Benq

8. HP

9. Toshiba

10. Panasonic

OPTICAL

WINNER



1. Western Digital

2. Seagate

3. Samsung

4. Hitachi

5. OCZ (SSD)

6. Maxtor

7. Corsair (SSD)

8. G.skill (SSD)

9. Intel (SSD)

10. Fujitsu

HDD



Cores: Our 6 or Their 4?

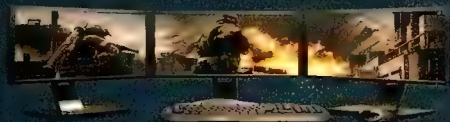
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Tomorrow's Visual Experience Today

AMD PowerNow!™ 3.0 Technology is comprised of a broad set of hardware and software technologies present in AMD processors. Not all processor models have all features or full enablement of these technologies and specific software drivers are required. VISION technology works with games that support non-standard aspect ratios, which is required for running across multiple displays. To enable more than two displays, additional panels with native DisplayPort™ connections, and/or certified DisplayPort™ adapters to convert your monitor's native input to your card's DisplayPort™ or Mini-DisplayPort™ connector(s) are required.

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ISP

You gotta get your data from somewhere...




We can remember a time when having the internet at your beck and call was optional – then again, we also remember when it didn't have pictures, let alone hyperlinks, Flash and LOLcats. Now, however, a PC with the net is like... a thing without the other thing that really makes that first thing really really useful. Like pie without filling.

Ahem.

Anyway, moving right along, the top spot for internet service was hotly contested – and bit of a David and Goliath tale to boot! Sadly... David didn't win. Instead, Telstra suffered the slings and budget deals of TPG to win out as the most trusted service provider. In particular, Atomicans really like **Telstra's Elite Liberty** broadband packages, proving themselves to be avid consumers of online content.

Which, in this age of Steam, easy access to torrents and vast virtual jungles of scantily clad people to ogle, is not all that surprising.

Honourable mentions go to Internode, iiNet and Telstra's evil twin (or red-headed step-child) Optus. These all rank pretty close together behind the winner, and certainly far enough ahead of all other contenders to make you think choosing anyone else is really not that wise.

One last note: we've not really drawn attention to actual losers in the roundup, but we're going to make an exception here. We really, seriously, and quite fundamentally cannot stand the Dodo Internet TV commercials, so we take special glee in seeing them come last in the top ten – they're not the most disliked of all ISPs, but they just scrape into our top 10, so we take that as carte blanche to put the boot in. ***stomp*** 

WINNER



CHOICE

1. Telstra

2. TPG

3. Internode

4. Optus

5. iiNet

6. Exetel

7. Netspace

8. Iprimus

9. Adam Internet

10. Dodo (Boo!) 

SOUNDCARD

YOU'LL HAVE TO SPEAK UP I'M WEARING A TOWEL.



WINNER



CHOICE

1. Creative

2. Asus

3. Auzentech

4. Razer


5. M-audio

We discovered two very interesting things in this category.

First up, there's a lot of Atomicans who rely upon onboard sound for their audio adventures. While we get that a soundcard might seem like a luxury, in our experience, almost any dedicated card will deliver better performance than an onboard solution, and probably offer far more versatility in general. So, listen up Atomicans – if you dig good sound in games, or like to listen to a lot of music, getting a good soundcard will boost your pleasure (well, your ear-pleasure, anyway) ten-fold.

The second thing we discovered is that amongst those Atomicans who do appreciate a good soundcard, the only soundcard worth mentioning is the **Creative Soundblaster X-Fi** range.

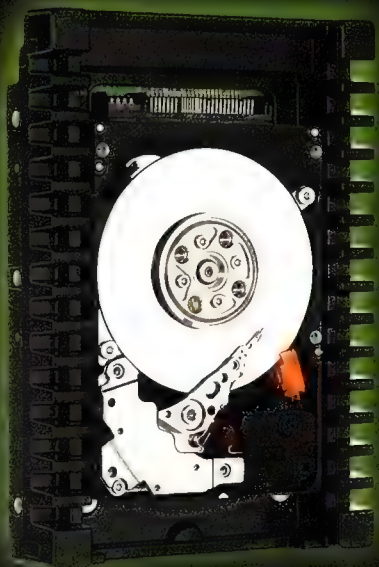
Now this is a really contentious card at Atomic HQ; when you compare the rigs of our Deputy and Editor there's a lot of kit (or at least brands) in common. But one thing that really splits us is the soundcard. Now, to break the Editorial Plurality for a moment, I have a Soundblaster X-Fi and really like it. Justin, however, thinks that while it is better than onboard, it barely ranks up against *real* soundcards. He may have a point, but obviously a lot of Atomicans agree with me – the enhanced sound and appealing price-point of the X-Fi makes it a compelling choice that doesn't break the bank.

Interestingly, there's also a not a lot of other competition, and what's there barely rates when you look at the numbers. So this is a big, if unsurprising win to Creative. 



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Faster.
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As used for storage capacity, one megabyte (MB) = one million bytes, one gigabyte (GB) = one billion bytes, and one terabyte (TB) = one trillion bytes. Total accessible capacity varies depending on operating environment. As used for transfer rate or interface, megabyte per second (MB/s) = one million bytes per second, and gigabit per second (Gb/s) = one billion bits per second.

PUT YOUR LIFE ON IT®



Mouse & Keyboard

More than just tools to collect crumbs and bits of skin.

This is another double-header of a category, but a pretty logical pairing when you think about it. Your mouse and keyboard is your window to interacting with your machine, and therefore not only vitally important (whether you're a gamer or an overclocker), but also one based on very personal choice, rather than raw performance or benchmarks.

So, with that in mind, we were quite surprised to see a clear winner in both categories – the same winner, in fact! Logitech has swept the board for our inaugural Atomicans' Choice awards, with the most popular mouse and keyboard combo being the venerable (and venerated) G5 and G15.

We always hear Atomicans talking about needing something to 'replace their old G5', so we guess we shouldn't be surprised – but nonetheless, this is an impressive result for Logitech. Coming second is Microsoft, with a solid showing for its recent X range of mice and keyboards, which we love. Both MS products are in fact our first choice, used on both work and home machines. The always plucky Razer takes out third in both as well – well done.

WINNER



1. Logitech

2. Microsoft
3. Razer
4. Dell
5. HP
6. Saitek
7. Gigabyte
8. Apple
9. Acer
10. Cybersnipa

KEYBOARD

WINNER



1. Logitech

2. Microsoft
3. Razer
4. Dell
5. HP
6. Verbatim
7. Gigabyte
8. Steelseries
9. A4 Tech
10. Cybersnipa

MOUSE



Conclusion

Well, that's a wrap for our first Awards. It paints a picture of a community of enthusiasts and gamers that not only respect performance and good design, but also hardware that's going to last. We had a lot of people submit well more than two systems, so we suspect that the supremacy of hardware like Nvidia's 8800 is because of a certain 'hand-me-down' mentality – but we respect that, too.

Certainly, though, when you see the impact of relatively new tech, like Intel's Core i7 range paired with DDR3 memory, efficient power supplies or ATI's 5-series video cards, it's plain that the average Atomican is an early adopter like no other. A pat on the back all-round. Now we almost can't wait for next year, to see how the average Atomic PC is going to change over the next 12 months! So, thanks for letting us know what's in your systems, and thanks too to our sponsors who, without which, we'd never have had enough blue ink to print all these pages.

See you in a year!

CORSAIR Founded in 1994, Corsair specializes in premium, high-performance peripherals and components for personal computers. Corsair's award-winning products are the delight of the world's most demanding hardware enthusiasts. As a pioneer in high-speed module design, Corsair is a trusted supplier to many computer manufacturers. In addition, CORSAIR expands award-winning products include USB flash drives, power supply units, solid-state drives, cooling systems and computer cases. For more information, visit www.corsair.com.



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Western Digital

WD, one of the storage industry's pioneers and long-time leaders, provides products and services for people and

organizations that collect, manage and use digital information. The company designs and produces reliable, high-performance hard drives and solid state drives that keep users' data accessible and secure from loss.

RAZER Razer is the world's leading manufacturer

of high-end precision gaming products and peripherals that are designed "For Gamers. By Gamers". Since 1998, Razer has collaborated with leading professional gamers to develop, manufacture and market cutting-edge gaming peripherals using proprietary technologies that give gamers the competitive edge. For more information, please visit <http://au.razerzone.com/>.

GIGABYTE GIGABYTE, headquartered in Taipei, Taiwan, is known as a global leading brand in the IT industry, with employees and business channels in almost every country. On top of motherboards and graphics accelerators, GIGABYTE further expanded its product portfolio to include notebook and desktop PCs, digital home entertainment appliances, networking servers, communications, mobile and handheld devices, servicing every facet of people's lives at home or business. Visit www.gigabyte.com.tw for more information.

KITLOG

These are our four basic systems, with something for every taste. On this page, the **Basic Game Box** is put together with money-saving in mind, but also an eye to getting as much bang for buck. It's the best value system for those who want a lot of processing grunt, but who don't want to sacrifice the upgradeability or compatibility that is so important. Intel's going to keep the P55 socket around for quite some time, so making the leap to this new platform is well-timed.

Mice are an undeniably personal thing, and the rodent that your friend loves may be one that causes painful pinky cramps in your gigantically oversized mits. Thankfully there are some decent bets you can make, and one of those is on this mouse; it's pretty comfortable in most palms, and the performance in-game is very nice. Plus it's wireless! Live like the future, today.

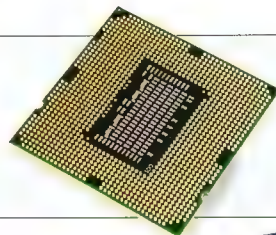


The Perfect PC, on the other hand, is the system everyone aspires to, with nothing but the best parts – without going crazy, though. It's a collection of all the greatest hardware that we'd pick without a budget, sure to impress with performance and sheer style.

Oh, and if you're wondering what the Ref IDs are, that's the ID of that article on our website. Just enter it like this – www.atomicmpc.com.au/?NUMBER – and you'll go straight to that review.

BASIC GAME BOX

CPU



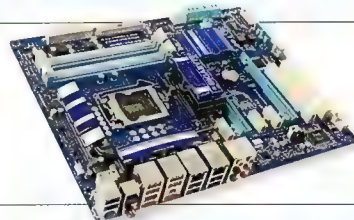
Intel Core i5 750
PRICE \$240

Intel's budget quad is more than you'll need in a chip!
Issue 106, Page 36

MOTHERBOARD

GIGABYTE P55-UD4
PRICE \$225

A great value P55 board with some nice features..
Issue 106, Page 39



MEMORY



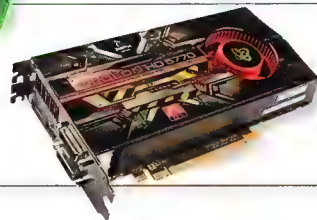
G.Skill Ripjaws 2000MHz
PRICE \$190

Great value memory with amazing overclocking.
Issue 106, Page 52

VIDEO CARD

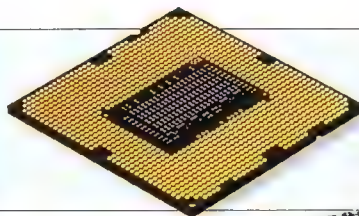
XFX 5770
PRICE \$200

A decent value way to get into DX11.
Issue 107, Page 47



THE PERFECT PC

CPU



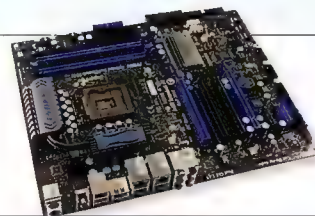
Intel Core i7 870
PRICE \$690

The best enthusiast chip, ever.
Issue 105, Page 34

MOTHERBOARD

MSI P55-GD85
PRICE \$320

P55, with all the SATA/USB 3.0 extras that we've come to love.
Issue 111, Page 38



MEMORY



Corsair Dominator TR3X6G1866C7GTF
PRICE \$388

Plenty of memory, blisteringly fast and darn sexy.
Ref ID: 149838

VIDEO CARD

ATI 5970
PRICE \$940

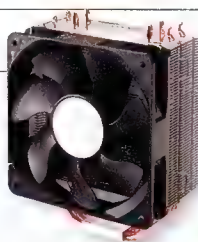
A dual-cored DX11 beast, the most powerful yet.
Issue 108, Page 34



For more builds check out the Kitlog E-mag at atomicmpc.com.au/kitlog

SUBTOTAL: \$1699

COOLER



Coolermaster Hyper 212 Plus
PRICE \$50

Nice cooling for a very affordable price.

CASE



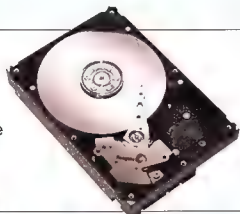
Lancool Dragonlord PC-K62
PRICE \$165

Vibration dampened, great cooling and sexy looks.
Issue 105, Page 49

SYSTEM DRIVE

1TB HDD
PRICE \$100

A thousand gigabyte storage drive on the cheap.



KEYBOARD

Razer Arctosa
PRICE \$50

A cool-looking keyboard that'll serve you very well.
Ref ID: 149483



DISPLAY



Viewsonic VX2233WM
PRICE \$199

21.5 inches of value-packed screen, great buy.
Issue 108, Page 42

MOUSE



Verbatim Rapier V1
PRICE \$65

Great gaming performance and nifty features.
Issue 96, Page 43

AUDIO

Plantronics Gamecom 777
PRICE \$85

Solid set of cans with great audio.
Issue 101, Page 41



Onboard Realtek ALC889A

A decent chip that does the job.

POWER SUPPLY

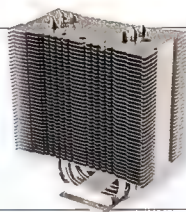
OCZ ModXStream Pro 600W
PRICE \$130

Plenty of wattage, reliable, modular for neatness.
Issue 109, Page 59



SUBTOTAL: \$5415

COOLER



Noctua NH-U12P SE2
PRICE \$95

Two fans, quiet and nice overclocking capacity.
Issue 107, Page 48

CASE



Coolermaster ATCS 840
PRICE \$370

Heaps of fans, plenty of space, and dripping with quality.
Ref ID: 132479

SYSTEM DRIVE

OCZ Vertex LE 100GB
PRICE \$559

Sandforce controller gives incredible bursts of speed.
Issue 113, Page 43



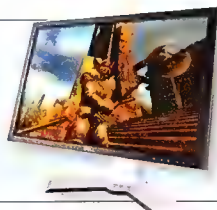
KEYBOARD

Microsoft Sidewinder X6
PRICE \$95

Backlit, sturdy, magnetic numpad & macro keys; what's not to like?
Ref ID: 129535



DISPLAY



Dell 2408WFP
PRICE \$899

A huge 24in LCD screen for your prettiest pixels.
Issue 103, Page 57

MOUSE



Microsoft Sidewinder X8 Wireless
PRICE \$105

Cable-less, comfortable, lag-free and fraggable!
Ref ID: 148422

AUDIO

Logitech Z-5500D
PRICE \$425

Earth-shakingly good.
Issue 48, Page 56



Auzentech X-Fi Prelude
PRICE \$279

Best soundcard ever!
Ref ID: 112419

POWER SUPPLY

XFX 850W
PRICE \$250

Plenty of power, ultra-stable rails and a great price.
Issue 107, Page 50



The **LAN Box**, the ultimate in portable gaming power – go anywhere, frag anyone. No longer will you be tied to a desk or forced to awkwardly manhandle your full-sized rig, helped by a convenient handle and beefy tech. Perfect for wowing people at LANs, the tech inside is fast enough to run any game, and boasts enough speed to keep your game running at full clip even if other programs intrude in the background. After all, no-one wants to miss a headshot.

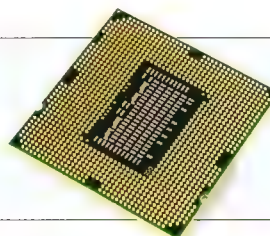
It's possible (even probable) that you haven't noticed the GTX480 entering into KitLog this month. Well, we really don't think that it makes the grade for any of these systems, and apart from the sheer fact that you can't actually buy a card if you wanted to, the performance doesn't stack up for the amount of money you've gotta throw down. For the online KitLog however, keep your eyes open!



Finally, for the more entertainment-minded – and really, that's all of us – there's our **Home Theatre PC**, ready to play movies and music quietly and efficiently. It's got plenty of speed for video encoding while you're away, but makes very little noise thanks to the passive components used – even the heatsink can be dialed down to emit as much or as little noise as you want. Perfect for leaving next to the big-screen TV for all your media needs.

THE LAN BOX

CPU



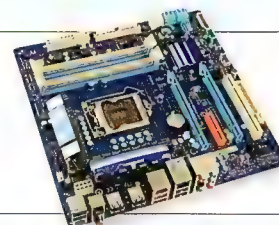
Intel Core i5 750
PRICE \$240

Intel's budget quad is more than you'll need in a chip!
Issue 106, Page 36

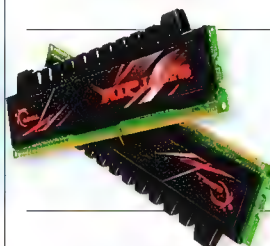
MOTHERBOARD

GIGABYTE P55M-UD4
PRICE \$195

Great overclockability, nice value.
Issue 107, Page 40



MEMORY



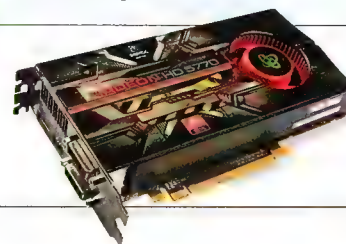
G.Skill Ripjaws 2000MHz
PRICE \$190

Great value memory with amazing overclocking.
Issue 106, Page 52

VIDEOCARD

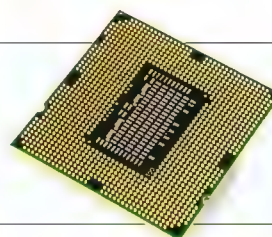
XFX 5770
PRICE \$200

A decent value way to get into DX11.
Issue 107, Page 47



THE HTPC

CPU



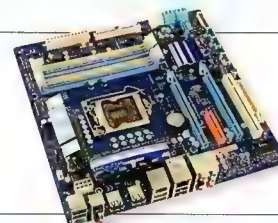
Intel Core i5 750
PRICE \$240

Plenty of power for HTPC duties, video encoding champ.
Issue 106, Page 36

MOTHERBOARD

GIGABYTE P55M-UD4
PRICE \$195

mATX form factor doesn't skimp on storage, or speed.
Issue 107, Page 40



MEMORY



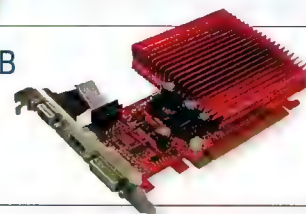
G.Skill Ripjaws 2000MHz
PRICE \$170

4GB of fast memory is plenty for running multiple HTPC media streaming apps.
Issue 106, Page 52

VIDEOCARD

Gainward G210 512MB
PRICE \$55

Perfect for Blu-Ray playback.



For more builds check out the Kitlog E-mag at atomicmpc.com.au/kitlog

SUBTOTAL: \$1654

COOLER

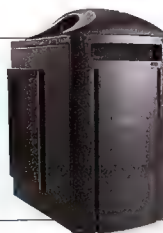


Intel Stock Cooler

PRICE FREE

Does the job, fits under PSU well.

CASE



Silverstone SG04

PRICE \$190

Small case with handle; add two 120mm fans for awesome cooling.

Ref ID: 148266

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1TB HDD

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A thousand gigabyte storage drive on the cheap.



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A cool-looking keyboard that'll serve you very well.

Ref ID: 149483



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Issue 101, Page 41



Onboard Realtek ALC889A

A decent chip that does the job.

POWER SUPPLY

Corsair HX-520

PRICE \$140

Modular, efficient and keeps size manageable in cramped case.



SUBTOTAL: \$2337

COOLER



Scythe Big Shuriken

PRICE \$79

Tiny 58mm height, quieter than a sponge.

CASE



SilverStone Grandia GD04

PRICE \$145

Stylish exterior, 3x120mm filtered fans, 2x3.5" HDD space with plenty of room.

Issue 108, Page 47

SYSTEM DRIVE

Seagate Barracuda 1.5T

PRICE \$145

Fast, voluminous storage for all your pr0n, videos and music.

Ref ID: 141622



KEYBOARD

Logitech diNovo Edge

PRICE \$199

Wireless board with a trackpad for mousing.



OPTICAL

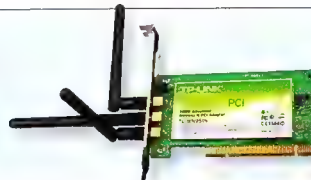


LG GGC-H20L

PRICE \$175

Bluray and HDDVD playback - best of both worlds

WIRELESS



TP-Link TL-WN951N

PRICE \$55

Zippy 802.11n for wireless HD video streaming.

AUDIO

Razer Mako 2.1 Speakers

PRICE \$469

Stylish tub-thumpers.

Ref ID: 126695



ASUS Xonar HDAV 1.3

PRICE \$270

Nice sound, expansion good.

Ref ID: 135112



POWER SUPPLY

Corsair HX-520

PRICE \$140

Modular and above all quiet for this whisper-soft build.



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3+1 Channel DDR3 1066/1333/1600(OC)

Shuttle SX58J3 supports DDR3 memory that meets the higher performance requirements of the 3D graphics, multimedia, and high-speed network.



Enjoy Top-of-the-line Performance with Intel X58

The Intel X58 Express Chipset supports the latest 45nm Intel Core i7 processor family at 6.4 GT/s and 4.8 GT/s speeds via the Intel® QuickPath Interconnect. Also, this chipset features dual X16 PCI Express slot with both ATI Cross FireX & NVIDIA SLI support.



Mini-ITX Motherboard Support

Shuttle expands the capabilities of its chassis, adding support for Mini-ITX motherboards (170 x 170mm or 6.7 x 6.7 inches).

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A hundred years of EULAs

Daniel Rutter stands up for DRM.

You may find this difficult to believe, but DRM can actually work.

No, really. I'm serious.

Look, for instance, at Valve's Steam system.

Steam doesn't look like DRM at all. It just looks like a big folder full of games, with a user-account login thing. You can install Steam on a new computer, and network the new PC to your old one and copy the steamapps folder over, and all the games will be there, working.

You can also install Steam on a friend's computer, and copy all of your games over. And then, whenever you're not logged into Steam, your friend can log in using your account info and play all of your games. It may be a violation of some agreement or other, but it'll work. As it

presents an opportunity for the media company to screw some more money out of a customer. So they must. No matter how much of an own-goal this always turns out to be.

Ubisoft's recent creation of games that *only pirates can play* is the most perfect form of DRM-restricted software yet seen. There are tons of other examples, though, and they all grow from the same short-sighted thinking. In a farming metaphor, the DRM-crazy content companies are yanking up every tiny new green shoot the second they see it, and not letting anything actually grow.

(This farming metaphor, for the benefit of the Atomic demographic, also works as a Tiberium-farming metaphor.)

infant media companies were all trying to use patent lawsuits as blunt instruments to stop copying. (The copying, by the way, was mostly being done by other record companies. Columbia Records' early history is particularly embarrassing.)

The licenses on those records – sometimes in a tasteful spiral around the edge of the label – were eerily similar to modern software licenses.

The only big difference was that, as far as anybody can figure out, the old record companies never actually did sue a customer. So, if anything, the modern content companies are going backwards.

Fortunately, though, there's a very promising light at the end of this tunnel. I'll talk about it next issue.

In a farming metaphor, the DRM-crazy content companies are yanking up every tiny new green shoot the second they see it.

should, because otherwise you'd have to buy a new copy of Peggles if you wanted to be able to play it on your laptop as well as your home PC.

This is where Steam diverges from the DRM we all love to hate. Because, you see, a system like Steam, that'll let you play a game on your laptop or on your PC but not both at once, does make it possible for *two different people* to play only one paid-for copy of the game, as long as they take turns.

This may be perfectly legal, depending on the jurisdiction and the interminable user agreement and how drunk the judge that heard the precedent-setting case was. But most software publishers don't give a damn about what's legal. They got to get *paid*, son, and that's all there is to it.

The two-people, one-software-license situation is exactly the sort of thing that attracts the content-company money-sharks. It clearly

You might find yourself wondering how long this nonsense has been going on. Licenses you 'agree' to just by using the product, media companies threatening their own customers with legal action... surely these are just the birth pangs of the still-young software industry, right?

So does it go back to when games came on floppy disks? Perhaps all the way back to industrial process-control software on punched cards? Wait, wait – perhaps it's older than software. How about when LP records were pretty hot technology? Was that when it started?

No.

Actually, Copy Control Crap like this – especially the license you 'agree to' by buying the product – started about a hundred years ago. If not earlier. There were license terms like this on *wax-cylinder records*.

This was partly because music recordings weren't copyrightable back then, so the

When Dan Rutter gets it right, he really gets it right.

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TUTORIAL

HANDS-ON TUTORIALS FOR THE TECHNICALLY MINDED

Have you ever been scolded by your teachers for letting your attention wander in class? Have you ever sat through detention after rampaging around the schoolyard with a flamethrower mounted to a quadbike, simply because you wondered what would happen? Do you ever get so bored while watching an action movie that your imagination generate images of explosions – even when there are explosions on-screen?

If yes, then it turns out you're just perfect to become a videogame

journalist, one of a proud and ever-growing club of writers each more childish and imaginative than the next. To help explain exactly what you'll need to break into an industry that is almost exclusively fueled by caffeine and sugary snacks, Chris Taylor leaps to the rescue wearing a bright green leotard, read to let you know what the deal is. He's enlisted the help of three past Atomic editors, but you may wonder why he wears that leotard.

Ultimately, it gives the freedom that all videogame journalists crave.



TUTORIAL CONTENTS

Atomic.edu
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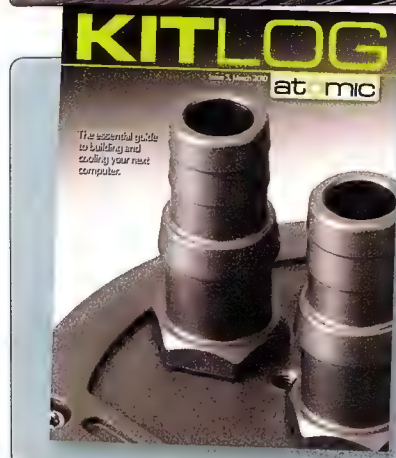
Chris Taylor speaks with three Atomic editors about the challenges of the videogame journalist.

WEEKLY NEWSLETTER

Keep up with the latest from Atomic!

Atomic isn't restricted to the pages of this magazine, and there's still plenty more to be had online. Make sure you grab the latest content, competitions and posts straight from your favourite mag by signing up for the weekly newsletter – it's what we would do!

www.atomicmpc.com.au/signup



Do you like building systems?

Are you keen to always know the best hardware for any PC build or rig? Then you need to check out our new KitLog eBook, a quarterly online publication dedicated to showing you the best gear for more than a half-dozen PC projects.

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Getting paid to talk about videogames



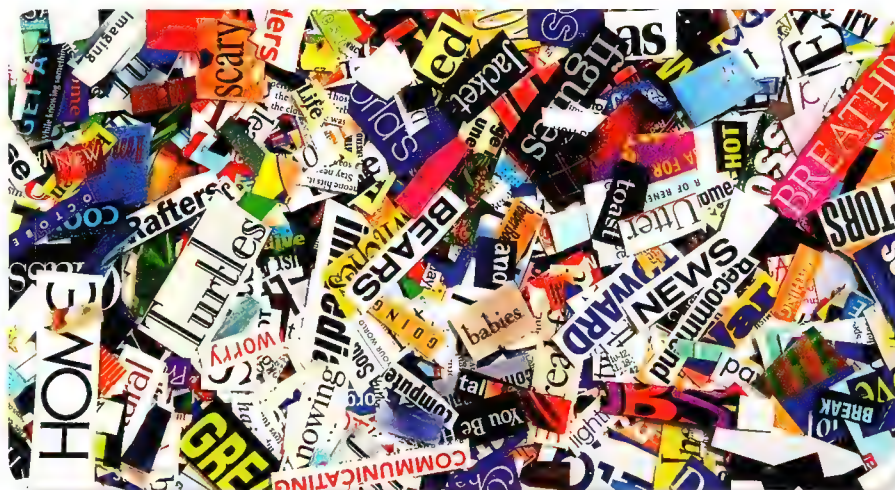
Chris Taylor will eventually convert all Atomicans into full-fledged journalists.

For a gamer, getting paid to play and talk about videogames is as good as it gets. It sounds like the cushiest of cushy gigs: kicking back in front of the television, cracking open a can of your favourite unhealthy beverage, firing up the latest title from Rockstar, burning through it in record time, spilling chips on yourself and then writing a review. If you fancy yourself a wordsmith, you've probably written reviews for forums or the 'reader reviews' sections of websites. It's easy, right?

Writing professionally is difficult. It's a demanding job. You need both speediness and an ability to produce good quality articles. You need attention to detail: yes, your work passes by an editor's desk, but he isn't going to be too impressed if he has to spend 30 minutes of his day correcting your spelling mistakes and grammatical errors. If you're writing reviews and editorials, you need to be able to back up your opinions with solid arguments. Grand Theft Auto IV isn't the most disappointing game of all time just because you say so. You're a writer probably getting paid by the word to talk about a videogame. You're not penning a Gospel.

You need to engage and entertain the reader. If you're writing tutorials, you need to be able to educate the reader. Knowing how to tweak the living shit out of the latest Intel chip is great in itself, but your knowledge and skills are useless to readers unless you can express yourself coherently and concisely. You need to be able to follow a brief: you'll be given a task and a date and time by which that task is to be completed. It doesn't matter if the videogame you've been sent to review is the dullist videogame of all time, if you feel small parts of your soul dissolving every minute you play it, if you could be doing any one of thousands of more entertaining tasks like rubbing coarse sand paper over your genitals: You were commissioned to review the game. You have to finish it. You have to write 1000 words about it. You can't just write 'horrid shit' 500 times and expect to get paid for it.

An important distinction to make, at this point, is between staff writers and freelance writers. Staff writers are employees of the publisher. Magazines and websites have a core staff. In our case, that would be David Hollingworth and Justin Robinson. The staff write a lot, but not all, of the content. Freelancers are brought in to produce more content. Freelancers like myself



are not employed by the publisher. Freelancers are self-employed: they have an Australian Business Number, they get commissioned to write a given article, they get paid an agreed amount per word or per page. If you're starting out in this business, you're most likely going to be starting as a freelancer. The marketplace is crowded with very experienced freelancers desperate for full-time staff writing positions, so few publishers are going to hire a kid with zilch experience.

If you want to try your hand at writing for money, you will need an ABN or publishers won't pay you. Luckily, ABNs are free and instantly obtainable through the Australian Business Register website (www.abr.gov.au). You will need persistence: expect rejection after knock-back after refusal. Sometimes those rejections can be very blunt and rude if your sample pieces are crap. Mostly, though, they'll be silent: you'll submit a sample for an editor to consider and then you won't hear anything back. At this point you need to reflect on your own work. What's wrong with it? Why isn't it good enough? Have you made an utter dick of yourself by leaving uncorrected typographical errors in every second paragraph? Financially, most magazines are doing poorly at the moment, but quality content can still find a home. You will be in a better position if you have and can demonstrate some highly specialised knowledge or a skill set that none of a magazine's current stable of writers possess. To succeed as a freelancer you must

have a willingness to work for little money.

This month, we spoke to three Atomic editors past and present: David Hollingworth, Ben Mansill and Ashton Mills. Between them they have decades of experience editing and writing for gaming and technology magazines and websites.

As an editor of a technology and gaming magazine, what do you look for in prospective writers?

"What I really want are passion and knowledge," says Hollingworth. "After that, it's really handy if they can write fast – in a deadline driven environment, being able to hammer out a thousand words in a half hour is a priceless skill. But first and foremost, they've got to be living in their field. If I want someone to write about games, I want a real gamer. Anyone covering overclocking should be living and breathing that stuff."

Mansill says, "The immediate acceptance that a journalist is a page-generating machine, not a holy caster of occasional opinion. Perfect copy on time. Great ideas for content. Passion and knowledge."

"An ability to write," says Mills. "That is: anyone can put words on the page, but not everyone can write. Then passion. There is no good copy without passion."

"And, as Ben said, perfect copy. Despite the 'editor' title, I want to edit your work as little as possible. Preferably not at all. I have better things

to do (see sections 1a: Managing Advertiser Expectations, 2c: Keeping Your Sales Team Happy While Keeping Your Integrity, 4d: Keeping Your Readers Happy and appendix 5: Putting Out Fires: The Daily Ritual).

"As an aside, magazines are, and I use this term loosely for some magazines, about education. And I'm a firm believer that people learn more when they're entertained doing it. So educate and entertain with your work. If they put down your piece and feel the time is well spent, you've done your job."

Is it harder to break into the writing game than it once was?

"Actually, I think it's getting easier – assuming you don't want to be paid," says Hollingworth. "It's never been easier to start your own tech site or blog. If you're good, you can then parley that into a possibly paying gig elsewhere. That said, the Global Financial Crisis (GFC) did cut down the number of fulltime positions in the industry, even here at Atomic."

"Catastrophically," says Mansill. "The GFC combined with the continuing struggle for publishers to monetise websites and the contraction of the magazine market overall has resulted in mass redundancies along with a scaling down of remaining permanent staff numbers. The result is a glut of senior and experienced writers prepared to work for less. New writers are, hence, shut out completely."

Where should prospective technology and games writers begin?

Hollingworth says, "Write. A lot. Whether you publish on a blog or a website or on a forum like Atomic, just keep writing. Write about your next PC build or the latest game you're playing. Take screenshots and write a walkthrough to share. That not only shows your writing chops, but shows your interest. After all, that's how Atomic tends to find its tech writers. Like Justin Robinson. He's now my deputy and a top second-in-command. One day he'll likely be an editor. And all that comes from the writing he did on the Atomic forums."

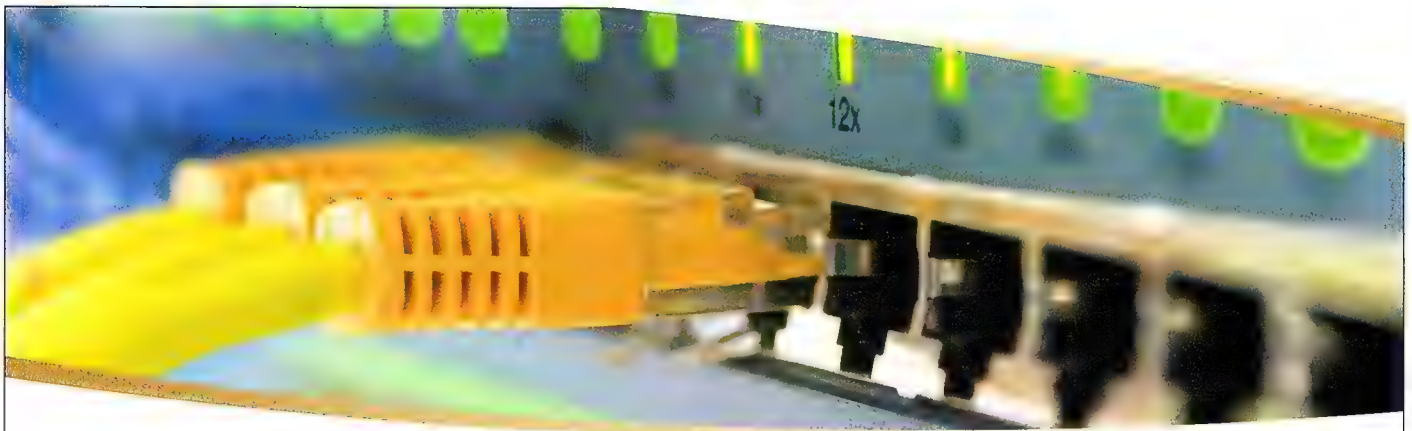
"Do an internship and impress the hell out of the boss and company," says Mansill. "Be the perfect dream worker. Then hope for crumbs as a freelancer, staying on the editor's radar and fighting like a wounded dog for any junior role that may come along and do it for peanuts."

"Adding to what Ben said," says Mills, "but focusing on freelancing: your greatest resume, your only resume, is your work. Interested in writing for a magazine? Send them a piece – yes, unsolicited – that they can publish. As in, it must be good enough to publish. It must match their content and style. It must appeal to the magazine's audience (remember, you write for the audience, not yourself). If you do all this it will be apparent you've studied the magazine and done your research, you are capable of producing good copy for the magazine, and



lo and behold here is a piece ready to go. Or if it just falls short, they might give you some pointers on how to improve it so it can be accepted. Regardless, your only investment is your time and you either get a positive response (put on their books, asked to write a specific piece or even have your initial work published) or you learn how to improve.

"Quick note: never give away your work for free. Don't devalue yourself. With your unsolicited piece, say in the email, 'If you like it, publish it and pay me and let me know if there's anything else you'd like me to write.' Or go further and outline some feature ideas or topics you think would fit with the magazine. If they like the idea and they see that you can write, you may just get your first commission." (C)



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GAMEPLAY

GAMES, GAMING AND FILM COVERED... ATOMIC-STYLE

We love to spin a yarn here at Atomic.

That's why, this month, Seamus Byrne brings you an Engine Room that's packed full with the history of gaming stories – from the methods that developers use to tell it, to what they actually managed to tell! And since there's so much to talk about, we decided to give Seamus (almost) four whole pages!

Also chinwagging is Justin Robinson, back from

a trip to the States to find out what's going down at Blizzard HQ, and what's taking them so bloody long with Starcraft. Will it be worth the wait?

It had better, otherwise we're gonna sit in the corner and pout awhile.

And because we love you (really), we've thrown in a bunch of reviews for other games that we think are neat, and thrown together a look back at an MMO, three months later. Reader, engage!

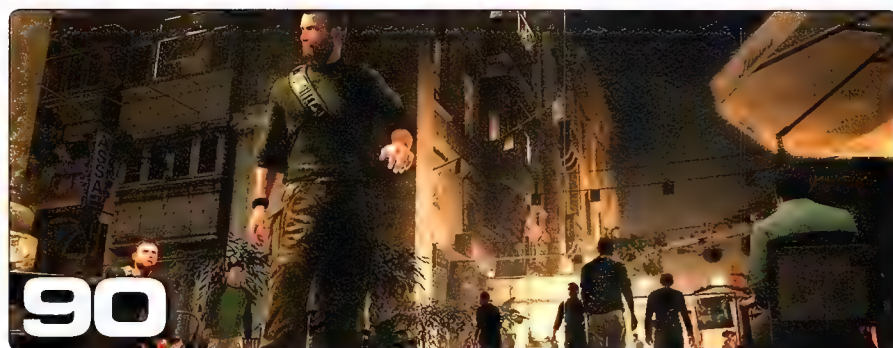
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Games and the art of interaction

Seamus Byrne tells a story about in-game stories.

When videogames were about nothing but 'pew!bang!zing!wakk!' the idea of play was motivation enough. Saving a princess or cleansing demon hordes on Mars was nice for the imagination, but games were games, and fun was its own reward.

Now games aspire to be more than just games. They want to move you emotionally, to make you think, or to make you laugh. Games can be just games, but games can also be art. But whatever the motivation, videogames must live within the parameters of what a computer will let them deliver. Through the evolution of more pixels, more colours, and more polygons, games are arriving at an age where the technology is truly ready to serve artists and storytellers who want to show the world why videogames are set to become the 21st century's medium of choice.

The limits of I/O

In his seminal 1984 book on game design, 'The Art of Computer Game Design', Chris Crawford outlined what made computers such a powerful

games medium while kids of the day were content to stare at Asteroids until their eyes fell out. It was an important question to ask, and still isn't widely appreciated. Why is a computer game better than a boardgame? Or a card

game? What are the strengths, and limits, of making a game on a computer compared to other game design options?

For Crawford, the key features of computer games are dynamic. They are real-time



The Art of Computer Game Design

The full text of Chris Crawford's book is available online, as the book is long out of print. It's a stellar piece of work sitting well ahead of the curve. Even in 1984 Crawford was pointing to "data transfer over telephone lines" as a feature that would let games feature huge numbers of players. And Crawford was also the guy who started the Game Developers Conference in 1987 as a meet up in his living room. Yes, he's kind of a big deal. You can find the whole book here:

<http://www.vancouver.wsu.edu/fac/peabody/game-book/Coverpage.html>

experiences that respond to the player quickly, and can be designed to change the rules even in the course of a single game. The computer also acts as game referee and intelligent opponent, saving us from the procedural delays that other game mediums demand when rules must be administered by sluggish human brains (and we all know how often fights break out over bad rule interpretations around a Monopoly board).

But for all this, Crawford saw some fundamental weakness in computer games, with input-output the greatest problem of all.

"The computer itself may be supremely responsive, but if the human player can't tell it what he wants, or fails to understand the computer's response, the computer's effective response is nil... The computer must communicate its responsiveness to humans; it does so through I/O."

Whatever a game designer wants to deliver,

it can only be delivered to the player via programming, graphics and sound.

Escape from CGA

"Four colours ought to be enough for anyone." — Nobody.

From where we began, there's little question that more pixels, more colours, and more polygons have greatly extended the output limitations Crawford was worried about. Sometimes limits are a good thing, and debate still rages over whether Pac-Man and friends are still inherently better games than much of what is served up today. But for those who want computer games to become more than simple games, limits have been a genuine enemy.

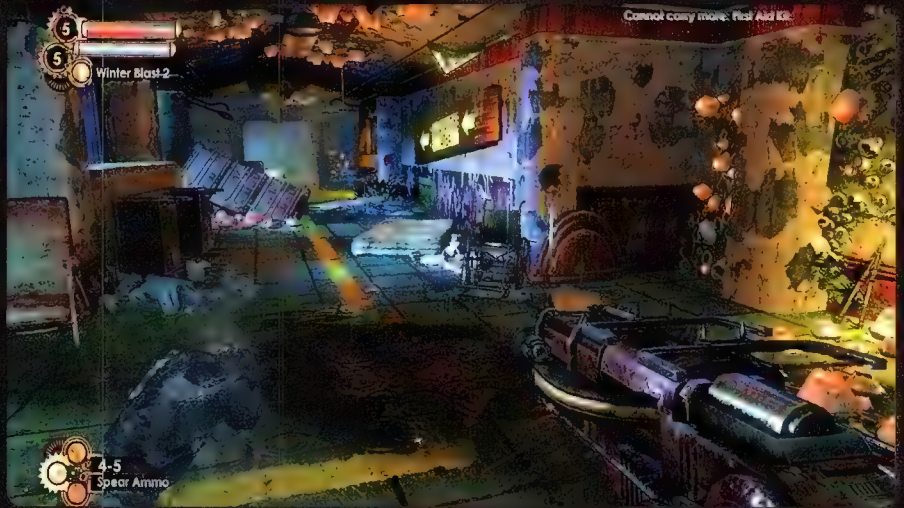
From pulling you deeper into the game world, to creating more options for visual feedback cues like HUDs, to shifting away from iconic

representations to graphics that actually looked like real things, moving from monochrome to CGA, to EGA, and into VGA and beyond wasn't just eye candy. It offered designers more options.

Experiments in full-motion video games look awful today (okay, they looked pretty awful at the time) but these were also important steps in an evolutionary process. When you want to extend your limits you need to try out many ideas before you work out where you should be heading.

Somewhere between the days of VGA, rasterised graphics and the shaders and effects of today, the race to make graphics better lost its way. 'Better' became focused on 'more realistic' and games have suffered as a result.

Like Myst. In the early 1990s, we'd had some amazing adventure games featuring good friends like Guybrush Threepwood and Roger Wilco, exploring static graphic spaces that formed backdrops to spritely little friends



who walked and interacted with what we could see. Input was stilted by the limits of the day, but these games were utterly engaging and filled with warmth. *Myst*, on the other hand, pushed graphics ahead of gameplay. It sold squillions thanks largely to great box art, but in terms of true gameplay the slideshow exploration system was ultimately another bad experiment. If you disagree, go take another look at *Myst* and see how it holds up. You could even argue *Myst* was party to the death of the adventure genre in the 1990s.

The problem with 'better graphics'

Let's blame the first-person shooter. FPS drove the development of our most stunning graphical environments, and our first-person perspective made us desire more and more immersion. I want to feel like I'm really in there! What's more immersive than feeling like you're looking through a window into a real world? As



graphics? As we approach diminishing returns, where else could this effort be directed to enhance the game experience?

And like the trailblazing *Half-Life*, we never have control taken away from us just so the game can tell us its story...

the race to the real took hold, FPS games were being bought, and often reviewed, based on how real the graphics felt. Gameplay and story were relegated to the status of passengers in our quest for ultimate immersion. How real is the water? How detailed are the trees? How well are the scanned faces mapped to enemy wireframes?

Back on those fundamentals of input-output, what limit does realism push back for a game designer compared with slightly less detailed

Thankfully this is already becoming an historic argument. Game designers are already heading down a road that puts graphics to better use. In fact, they put even *better* graphics to better use. Now our graphics, and our sound, are pointing back to the most fundamental feature a computer game can deliver: dynamic interaction. By responding to the player more directly, more dynamically, and in real-time, game designers are giving us the best experiences we have yet seen. All thanks to better graphics.

Don't tell, show

From the story side of the fence, it's been a rough evolution. Game writers and artists have been living in different worlds, with very limited ability to come together and show the story instead of just telling it. Thus the history of bad dialogue and messy separation of exposition from gameplay. For games that just want to be games, that's fine. For games that want to be something more, that just isn't good enough.

Today, game artists can work closely with designers to give a game a sense of style that suits its story. Compare *Modern Warfare* and *Team Fortress 2*. One aims to offer immersive, even modern warfare. The other suggests you should bring a sense of fun and personality to your multiplayer attitude. It's hard to act like a total douche munchkin when playing *TF2*. Sure, many succeed, but anyone who doesn't live in a basement... you get the idea.

Game designers and writers can also rely on artists and programmers to deliver on the promise of dynamic interaction. Which means story itself can be woven into the fabric of the gameplay, revealed at the right moments as the player moves through the world, and delivering highly cinematic sequences while remaining entirely interactive throughout.

Splinter Cell: Conviction is a textbook example. At one time we may have been forced to endure inner monologue, or bad conversations that forced story exposition into our earholes. In fact, we still endure such tortures. But *Conviction* shows another path, using text and video overlays on the game world itself to show what Sam is thinking, what is driving his efforts in the game, and what he should be doing next. At one notable moment (seen in demos, so it's no spoiler) where Sam is approaching his daughter's killer, we could easily have been programmatically delayed by some forced thought dialogue. Instead we see our daughter's face projected onto a wall as we climb a staircase, which then dissolves into her headstone. It's a powerful moment that quickly gives you the story's emotive direction



— "of course I'm going to kill this fucker!" These are conventions drawn from modern cinema, breaking the rules of what we think is allowed to appear "in game" versus what would usually be presented as simple HUD overlay or separated story. But when done well it draws us in more than ever before.

Bioshock also plays the player with conviction. Its world is stunningly realised thanks to wonderful art direction that uses the latest graphics technologies to ensure the world feels real, and that water is essentially another character in the story. And like the trailblazing Half-Life, we never have control taken away from us just so the game can tell us its story (or do we?). We can ignore some of the story, or we can dive deeper through the audio recordings found throughout Rapture.

Building atmosphere is more essential to elevating game experience than mere graphics, and here audio plays an essential role. Bioshock keeps us aware of the decaying undersea realm constantly through dynamic audio cues. Classics like Star Wars: X-Wing also enhanced our immersion by dynamically blending the original Star Wars music score into the game based on what was taking place at the time.

Blizzard, a long time exponent of artistic flair over realism, made a significant choice to foreground art and style in World of Warcraft. In the world of MMOs, you're spending a lot of time in the world, and often returning to the same places you've already seen before. Blizzard delivered a world of vibrant colours, with zones adhering to well designed colour palettes that presented the story of the world itself. When you arrive in a zone like Desolace or Felwood, you know the land itself is troubled. Contrast with Everquest 2, launched around the same time as WoW, and you felt like most of the world was as drab brown as only the most troubled regions of Azeroth.


The Saboteur is another recent title that used the atmosphere of the world, in this case an occupied Paris, to great effect. You didn't need to be directly told where things were going. From a 1940s film aesthetic with constantly oppressive weather punctuated only by red signage where the Nazis were in control, the game offered direct relief when you helped bring the people of Paris back into control of their own

How shaders saved game design

When speaking of atmosphere, it's hard to skip the literal aspects of world lighting, smoke, colour, and how the presentation is layered dynamically thanks to the modern state of the GPU. So let's bow before the magic of shaders. Once literally the tool used to add colour and depth to pixels, modern shaders basically make the game world go around. Technically, shaders are little programs that get pumped into the GPU to describe what everything is meant to look like — position, texture, colour, alpha values, and more. Beyond the enhanced ability to change lighting and texture dynamically, it's also made it easier for designers and artists to tweak their efforts up to the last possible moment during game development. If it wasn't for the modern GPU, Gearbox would have probably stuck with the more boring and realistic Borderlands designs seen in early previews. But artists with greater creative capacity were able to explore fresh ideas, test their 'concept art' styles, and get it into the final game, making Borderlands one of the most impressively styled games of recent times.

destiny.

There are so many new tools being explored right now. Dynamic audio cues that foreshadow what might be around the next corner. Dynamic graphics that make the air thick when an evil presence draws close. Dynamic weather systems associated with character mood. Dynamic game difficulty that responds to the way you play.

In some ways it's sad that we have only recently begun to deliver on game devices that Crawford suggested 25 years ago would be common features of computer games. But this also points to a rising maturity that promises much for the future. A maturity of game technology that sees programmers and artists ready to hand the keys to designers and writers like never before. 



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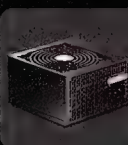
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MODIFICATION

with Ashton 'For the love of Mod' Mills

Flesh

Game Half Life 2

URL www.moddb.com/mods/flesh

Flesh takes the FPS game that is Half Life 2 and, well, removes the FPS. Instead you're given a horror adventure flick that relies on wit instead of twitch. In fact, there is no combat – the encountering of enemies is survived by avoiding, sneaking, or otherwise running away. But in a manly fashion, of course.

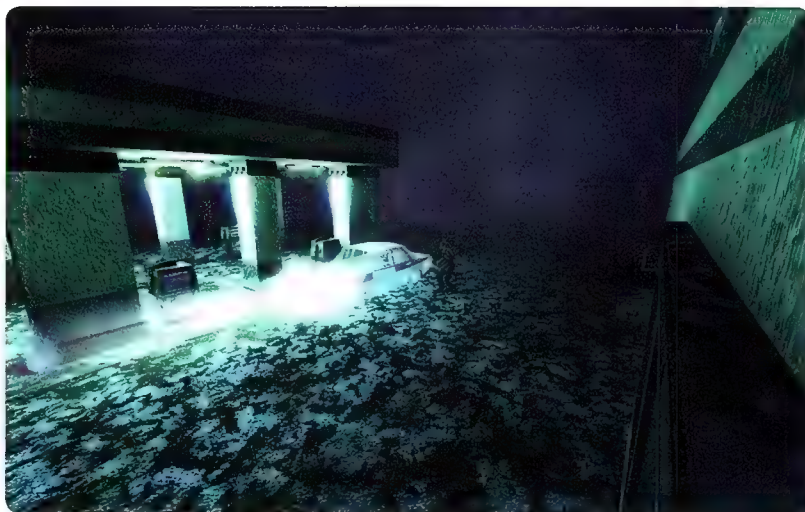
And it's a nice change. By making combat not an option, your brain instantly switches to survival mode and all the logic systems that enable you to think, instead of shoot, your way out of a situation.

Indeed, it's so fixed in its storytelling style that there's no vertical movement, and there's no strafing. The mouse plane is locked horizontal. This takes a little getting used to at first, but it strengthens the fact that this isn't an FPS. This is a creepy interactive horror story, and the lack of a movement plane will be the last thing on your mind as the hairs on the back of your neck stand on end.

The atmosphere is very well done; right from the outset you're plunged into a foggy night, driving along the road in the dark. Encountering a crashed car, you investigate and find no one alive, but movement in the nearby forest catches your eye. Entering the forest you find a large sign that reads "PRIVATE PROPERTY, KEEP OUT". Why, whatever could they be hiding? Your curiosity may be your undoing, but it's the only way forward.

Soon after you learn to turn your torch off lest you attract the attention of some fairly zombie-like inhabitants, and a scrawled note attached to a wall tells of a much more ominous presence...

While the Half Life 2 engine is starting to show its age these days, it's refreshing to find a mod that isn't based around shooting things. Play with the lights off, headphones on, and a few spare pairs of pants nearby. You'll need them.





Clear Sky Complete

Game Stalker Clear Sky
URL artistpavel.blogspot.com

The release of Metro 2033 brings the genre and game world of STALKER back to the fore, and so it's fitting to take a look at the recently released version 1.1.1 of Stalker Clear Sky Complete, an overhaul designed to take a great game and make it greater (let me have this word Dave!).

While primarily Clear Sky Complete focuses on new visual fidelity in the form of new textures (landscape, weapons, mutants and humans), skyboxes, lighting effects and distant scenery (which, according to the homepage, includes real shots from the artist's tour to Russia), it also makes a number of other improvements to the game.

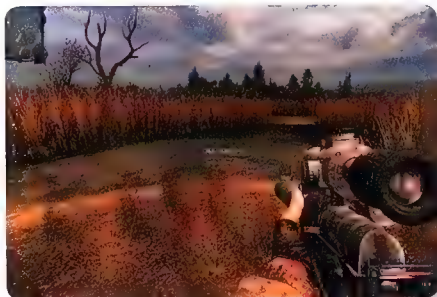
Sound has been enhanced to flesh out the atmosphere with quality ambient source files (which you notice right away while walking among the marshes), with the addition of night and day ambience. Weapons, naturally, have also received improved effects as well.

Add to this much improved UI changes, a range of bugfixes including common quest errors (which can be fixed individually by other mods, but are a welcome integration here), and a number of excellent tweaks like proper ironights for weapons and the ability to trade weapons with NPCs, and you have yourself a comprehensive overhaul that

greatly improves Clear Sky above and beyond what GSC Game World original released.

However, don't expect it to do wonders for the engine though – turning on full detail and using DX10, even on a relatively beefy GTX 280 SLI system, the frames come a'dropping. It's possible that the increased texture memory use doesn't help either.

Clear Sky Complete is so polished it even changes the main screen graphic and music theme. If you're looking for a single installable mod that improves the most important aspects of the game, this is for you. (E)





Starcraft II: Wings of Liberty Campaign

Justin Robinson travels to Blizzard HQ to get the scoop on their latest big release.

In the world of PC gaming, few strategy titles stir up as much excitement as Starcraft II. As the only upcoming PC exclusive in the foreseeable future, this is a game that has reinvigorated the argument for that custom-modded rig you've rightly clung to, and provides yet another reason to stay far away from the sterile land of consoles. But in taking on this role as 'saviour of PC gaming', have Blizzard stretched its resources and talent too far? Can Blizz really revitalise and rework a genre for which the company's already so well known? We went straight to HQ to find out!

There are so many considerations to keep track of when creating a sequel that we'd literally run out of room here if we addressed them all, but it goes without saying that the original Starcraft is getting so long in the tooth that it's chewing on its own brain. While it's still played competitively, it's been the same for over a decade, and it's time for a shake-up. It's time to do things a little beta...

World's hardest balancing act

The Starcraft II beta has been one of the most important milestones in the game's development cycle, providing the devs not only with a way of playtesting their engine on thousands of varied computers, but also giving them an insight into both unit and player behaviours. We spoke with Dustin Browder, Lead Designer, and he explained the excitement that the beta generates. "We've been able to deal with issues like Zerg v Zerg being so stale", he said. "We nerfed the heck outta the Zerg – not because they were so powerful, but because ZvZ was so boring!"

Getting the balance right is a mammoth task; even the smallest change to a unit can have a serious knock-on effect somewhere down the track. Dustin highlights the Terran Raven as a great example. "Right before beta it was insanely powerful. We owned everyone

with it! Everyone was like 'AAH THE RAVENS'. What I'd love to do with that one is bring it back down off the fusion core and make the balance adjustments, so we see it used a lot more." It's not only balancing the units that are included in the game that poses such a headache – even deciding which units to include is an arduous task.

"The Lurker is certainly a unit that we love, but it conflicts against a lot that is in the game", Dustin solemnly muses. "What we ended up doing is taking the Lurker and





pushing him up to tier three – and he could almost survive – but at that level there's plenty of detection." The Lurker was then removed from the game, since it simply didn't fit into the world any longer. When prodded about other units that had been considered for removal, Dustin gleefully smirks, "The Archon has been on my chopping block for months." As if the job wasn't hard enough to begin with, different regions in the world have incredibly separate play styles that confuse things further. "For Korea, we need to nerf the Zerg in the worst way. In Europe and America, we need to buff them IN THE WORST WAY."

Thankfully there is a clear and easily identifiable benefit of going to all the hassle of tweaking units and balance settings for the game, which results in a meaner and leaner end product. "Right now, our racial matchups are within 1 per cent win/loss", explains Dustin. This is a great sign that shows just how close the game is getting to a final, ship-ready and fully balanced state.

GG, noob

The original Starcraft is, quite frankly, an impossible multiplayer scene to enter on the competitive level. Unless you've been born with fingers that have brains in them that allow totally autonomous decision-making and multitasking, the learning curve for newbies is steeper than a vertical plane. With that in mind, SC2 comes with a buttload of extra modes that help lubricate entry into the higher echelons of play – or even just to get you online. Add on top of that a bunch of Challenge modes crafted specifically to

strain your micro skills, hotkey skills and general ability to retain mental functions under pressure, and it wraps the learning curve up into neat little packages.

Dustin describes an imaginary player and takes us through their experience of the game. "I expect a lot of players to sink into the singleplayer campaign for about 20 hours. Then I hope they'll go online a little bit and play co-op against an AI, then I hope they'll try a 3v3. Somewhere six months from now, I'm



hoping this fantasy player of mine will jump into a 1v1 match."

One gigantic interactive cinematic

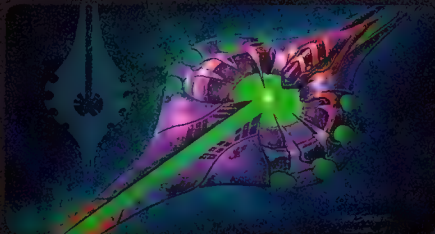
With the first and most important step labelled 'singleplayer campaign', you'd be forgiven for thinking it was just like the original. Indeed, most RTS games give you a linear progression

Star2 Engine

The 3D engine that powers Starcraft II is not your standard off-the-shelf affair. Completely designed from the ground up by Blizzard, it's not the prettiest engine ever designed, nor even the prettiest game. However, a single GTX275 card has more than enough grunt to run the game at Ultra settings at 1680 x 1050 – only missing out on SSAO support. Even though sheer graphical grunt isn't required, we did discover that it demands at least 1GB of video card memory at these settings – Chris Sigaty boasts that some textures in the singleplayer game "have 2048 by 2048 [pixels]". To put that into perspective, the textures that are wrapped around some objects are *larger than the final outputted image!* Topping this off is support for two CPU threads, and Havok physics keeps things very interesting.

Unfortunately while the game runs just

fine at high settings with large textures, it sadly does not support antialiasing out of the box. There are so many jaggies that in some instances it's hard not to be distracted by them! Though this is disappointing, Chris remains optimistic for the Star2 engine. "It's got a ton of potential for scale. You'll see some very interesting things. I mean, story mode itself, or the parts inbetween missions, that's all really in an RTS engine. We have the Lost Viking mission that is really interesting; play with the keyboard, press spacebar to fire and there are even powerups!" In effect this mission is similar to 1942 the arcade game, and it's also a great sign for some crazy mods. Chris agrees: "I don't think you could see that and go 'oh, there's the Star2 engine'. It's just the level of capability that the modders are gonna have." Read the full interview at <http://tinyurl.com/SC2Atomic>



of levels that take you by the hand through a brief and unfulfilling campaign, where the most variance you'll be lucky to get is the odd defend-this-base or guard-that-convoy mission. Starcraft II takes that mentality and kicks it up three notches – far beyond what other games have provided in the past.

Starting with a cinematic that introduces Jim Raynor (resident badass) and his close, slightly dodgy friend Tychus Findlay (almost as badass), the campaign moves to the first few tutorial-style levels, before it finally removes the leash and grants you entry to Raynor's Battlecruiser, the Hyperion. The Hyperion acts as the hub that ties together every interaction with the game. There are four major areas on the ship to visit – the Bridge, Armoury, Research Lab and Cantina.

Home is where the fusion core is

Missions are all selected and reported on the Bridge, and each are presented via a main console in the centre of the room. Also present in the room is Tychus, who provides insight into future missions and past experiences with Raynor, with other characters floating in and out who also give their own perspectives based on progression through the storyline. There is no set order to mission completion and Chris Sigaty, Production Director, explains how they work. "Ultimately the story, the final outcome of the story, is a football. I mean, you start out here, and you will end there, but the path along the way [may be different]. Various

characters, based on the choices you make, do get affected."

Each mission offers achievements for completing certain tasks, such as successfully slaying tough units, collecting research materials, or performing difficult goals in-game. They can also be individually replayed via a console on the Bridge, and as each mission is timed, it can be quite challenging to try to beat your own attempts. You'll spend the majority of your time working through the campaign; but our most-visited room on the Hyperion was definitely the Armoury.

This room, located within the bowels of the Hyperion, is essentially a showcase for every major unit you've unlocked throughout the game, as well as being the only way to access unit-specific upgrades. Each





unit, from the Firebat to the Siege Tank, is rendered in a high-detail model with matching and surprisingly hilarious descriptions. The aforementioned flame-loving Firebat wields a CMC-660 Heavy Combat Suit, and the first-ever recruit is described as "the first fighting firebat, reformed mass-murderer". Optional unit upgrades are accessible through a console that gives stat-boosting capabilities, with two tempting choices for each unit that seriously change their behaviour in-game. These come at the cost of credits, won by completing missions.

These upgrades are persistent throughout the remainder of the singleplayer campaign, and there are enough credits in the whole

campaign to purchase 70-80 per cent of the tech upgrades. This mechanic is entirely new to Starcraft's campaign, and when we played with it we honestly couldn't see ourselves ever wanting to give it up. Units that start to become stale or unused simply due to limited health can be buffed easily, and already-powerful units can be made even more so.

There are some hard decisions to make when you get to the third room; the Research Lab can only grant a maximum of 50 per cent of all unlocks, even if you manage to complete all the gathering tasks given in the missions. By collecting Zerg DNA and Protoss Artefacts, research is completed that unlock abilities that affect the Terran's play style enormously – but

this mechanic is made more complex by giving two tempting upgrades at a time. Of these, only one can be chosen; the other is locked for the rest of the campaign. Abilities are dangled under your nose like carrots; there's double-pumped SCV production from a Command Center, autonomous Refineries that suck Vespene gas out without the need for dedicated harvesting units, and army-wide health or firing rate increases. This shapes a unique playing style, and can make each playthrough vastly different.

Finally, the Cantina is the most fun of all the rooms on the Hyperion. Here you can check a TV for up-to-date news pieces that keep you posted on the story and general universe updates (such as what the pesky Emperor Mensk, left, is up to), play a 2D arcade cabinet, chat with characters in the bar or check out a very shady dealer at a table. This is another great mechanic that only the singleplayer campaign boasts, and this dodgy dealer gives you access to Mercenaries – high-end 'hero' versions of units that you've already unlocked. Not only are their health and offensive ferocity buffed, but they also come complete with unique models that set them apart visually from standard units – such as the Goliath mercs that are almost twice as large. After using credits to unlock them, the merc units can be called in during missions. They can only be used a certain amount of times per attempt, suffering a cooldown period before they can be re-deployed, but their use can really turn the tide of battle in a pinch.



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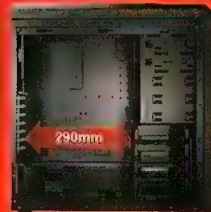
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Mission: decision

Choice is definitely one thing that SC2 brings in spades, but the Wings of Liberty campaign also comes with more than enough fun. While we initially had reservations at the Terran-only focus, each of the 26 different missions has their own form of fun to be had. Dustin highlights the ultimate goal for the campaign: "We don't want any of these missions to feel like a skirmish game; we want each one to feel like its own special gameplay mechanic." And special they feel; from missions that involve defending a gigantic laser (used to drill into a sacred temple to steal their precious artefact, Indiana Jones style) to dream sequences that re-live memories of characters and events past, and even an edge-of-your-seat race against the Zerg to reach a Protoss base, to secure the objective first.

Of all the singleplayer levels that we've played through so far, one stands above the rest. Titled 'Welcome to the Jungle', it's a stellar example of a level that not only feels completely unique, but is familiar enough to still be fun. Calling you down to the surface of a jungle planet to harvest a gas called Terrazine from 13 different nodes across the map, this level involves the building of a base with a strong economy much the same as with other levels. Where this one differs is in the goal – conquest isn't your objective here, and you're instead tasked with collecting seven node's worth of Terrazine gas.


However, a rogue Protoss force also occupy the planet, harassing your forces when you attempt to harvest from each node. To make things even more interesting, the Protoss side systematically shut down the nodes as you play! It's a race against the clock to get seven nodes harvested while

juggling a full base and economy, protecting your harvesting units and keeping an eye out for the optional Artefacts that are scattered across the map. It's hands-down one of the most fun levels we've played in any RTS title, and while it's a pretty serious challenge on Brutal, there's still plenty of enjoyment to be had on Normal too.

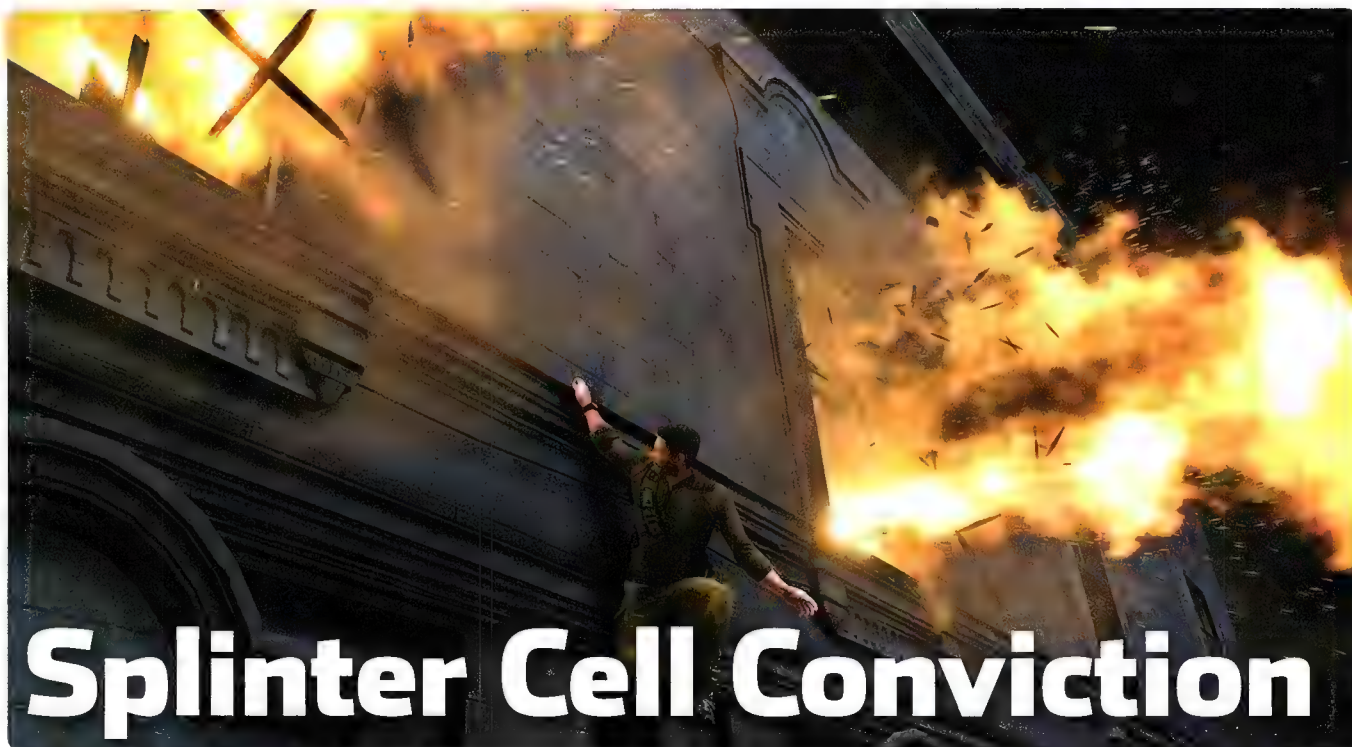
Worth the wait?

If Starcraft II had been in development within a few years of the original's release, qualifying the wait wouldn't be a hard task. The world is not perfect, though, and Blizzard has been developing SC2 since work on Frozen Throne was completed in July of 2003 – seven years later, we're finally seeing the result of

their work. Don't get us wrong: the game is expertly balanced, singleplayer is fantastically fun to play, multiplayer is new-and-old all at once, and it's all rendered in a highly detailed 3D engine. However, in focusing on one side for the campaign, we feel that there's a part of the story that is yet to be told, and the wait for the first expansion pack leaves us waiting for more, and feeling a little dirty to boot.

But really, that's a sign that proves Blizzard are onto a winner. If we can see the same polish applied to every facet of the game, if we can play the final build and see its replay value, if we can finish the campaign and not feel too cheated by the cliffhanger – then Starcraft II may prove to be the best RTS of the next decade. 





Splinter Cell Conviction

Sam Fishers's back and... yadda yadda yadda

We've always wanted to like the Splinter Cell series. The gritty setting, the reliance on smarts over firepower, even the voice talent (Michael Ironside!) appealed – but we could never get behind the stealth mechanic of auto-failing a mission if you trip and alarm or get seen by a guard.

So, of course, we were looking forward to Splinter Cell Conviction and its reworking of the series to a more combat-focused game, that doesn't kick you in the crotch if you get spotted, but simply makes things tougher.

Why then, do we feel so singularly uninspired by it all?

Conviction's way or the highway

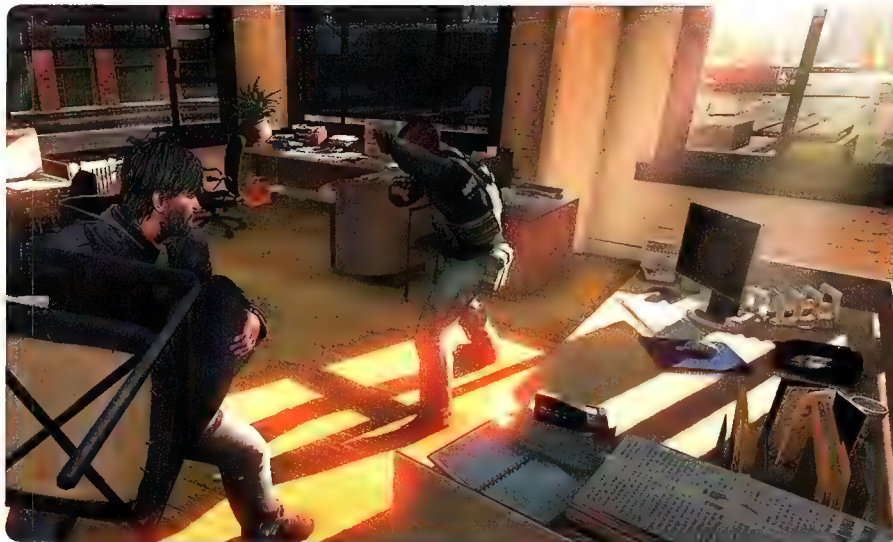
The plot behind Conviction is simple and straightforward – Sam Fisher's daughter is dead, he's angry, and you get to control that rage as he seeks revenge. Sure, there are plot twists galore, and betrayals and McGuffins, but at its heart, Conviction's trying very hard to be a Jack Bauer-esque thriller.

This is incredibly apparent in the 'interrogation' sequences where you're expected to beat a piece of information out of someone. It might be pretty impactful, too, were it not more like a slowed down quick-time event than a real challenge – you simply walk a badguy around until you get the opportunity to mash a key. We didn't think much of The Godfather 2's interrogation gameplay, but at least it had some depth – Conviction comes off as both mildly distasteful *and* pretty boring.

But that latter statement sums up the single player campaign pretty well – the locations, the plot progression... it's all Bourne by numbers.

Rather than anything truly new and fresh, and though we expect a certain amount of cribbing from games like this, it still seems impractically over the top.

There's a lot of great mechanics in the game, but they all seem to be designed to make up for shortfalls in the game's design. The 'mark and execution system' (essentially an insta-kill), for instance, seems a great innovation, until you realise that it takes any skill out of the game. Similarly, the move-to-cover mechanic, which lets you zip from pillar to crate at the press of a button, seems innovative – until you again realise it's now the game that's being stealthy, not you.





Ultimately, the combination of sneaking and balls to the wall combat might be good if it didn't feel like a dumbed down version of Hitman – a game that delivered truly open infiltration and stealth-based gameplay, while at the same time giving you challenging gunfights once the gig was up. Conviction tries hard for a similar level of verisimilitude, but when you can beat a mission by simply hanging out of a window and pulling out all the occupants of a room – who all seem to move in an orderly fashion to their eventual doom – you know something's wrong.

Similarly, while Hitman was more than happy to let you complete a mission no matter what way you kill a guy or when, Conviction avoids that by requiring you to do things in the right order. In one early sequence we needed to get into a building and rough up some interchangeable mook to learn... something or other. The direct route is merely an awesome way to get blood on the carpet; what's needed is stealthy murder! So you

kill, creep, run, dangle and kneecap your way to the villain, only to be told you can't pull his pigtails yet because there's still a guard alive. Somewhere.

As it turned out, in the time it took us to find this mouthbreather (who was humping a pillar), we could have questioned the mook, apologised, bought him dinner and maybe even hugged.

When you do get to question him, uber-badguys arrive, and while you're desperately yelling at Sam to try and get him to jump out the window that is JUST BEHIND HIM, or to step slightly to the left, you get trampled.

But that's the game's linear tunnel-of-fun in a nutshell – you can make tiny decisions, but ultimately to get from A to Z you must first touch base at B, C, D and all the rest.

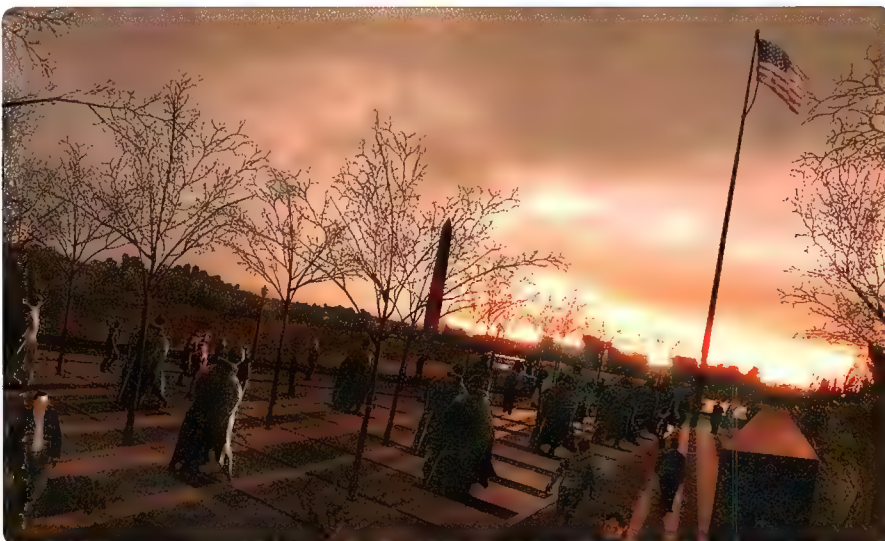
Thankfully, the single-player game can be finished in about five hours, so at least you're not going to be frustrated for long – unless you were actually hoping for a singleplayer game that had any kind of substance.

But wait!

Yes, there is a lot more to the game, and many of the other modes – co-op missions, challenge levels and what-have-you – are fun. But we can't help but think that if we had actually paid for the game we might feel we'd been a touch ripped off to get only five hours of main character padded out by add-ons populated by the B-team of the game.

If anything, Conviction feels a lot like Valve's Orange Box release of a few years ago – albeit without any charm or any game with enough substance that you'd actually want to play for more than a few sessions.

Perhaps we are missing something after all. Maybe we don't have a proper appreciation for the character and its turgid backstory, or perhaps we just suck at stealth games... but for whatever reason, Splinter Cell is, in our opinion, lacking in just that – conviction. **DH**



Xbox 360, PC (reviewed on 360)

Developer: Ubisoft Montreal
Publisher: Ubisoft
Website: splintercell.us.ubi.com/conviction

Gameplay

Short, seemingly arbitrary, and at times frustrating.

66

Graphics

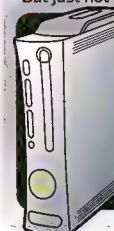
Arguably the best part of the experience.

89

Sound

Gotta love the old Ironside. But just not this much.

80



Overall
We're in the minority, but this game seems pretty poor.

70%



The titular pair of criminals move to Shanghai for a new beginning... but can they turn over a new leaf?

We'll be honest up front - we're being clever with that whole new leaf schtick up there.

The reasoning is Kane & Lynch was a game we really wanted to like (which we seem to get a lot). It had fresh-feeling characters, a wonderfully gritty take on LA crime rarely seen outside of the pages of crime fiction, and borrowed heavily from one of favourite films of all time: Heat.

But, for all that, it simply wasn't a good game. And it was pretty poorly received, too (and we won't even go into the whole GameSpot thing - well, not right *here* anyway), so the reasoning behind the sequel is kind of odd. Thus, the decision to move the game's setting to Shanghai is not only a new beginning for the characters, but for the franchise as well.

But does the gamble pay off?

So ronery

Dog Days' single player is the usual crime epic. As the game starts, Lynch is living in Shanghai with his girlfriend (and, really, how desperate does a girl have to be before a sociopath like Lynch starts looking attractive?!), and is about to meet up with his old pal Kane, who's coming in to town to be a part of brokering an arms deal. The catch-up is meant to be simple, with more effort put into organising a local dinner than keeping on top of the bodycount.

But that would be boring: before you know it, you're hip deep in a gang-war, for which it turns out that Kane is partly responsible.

Setting the game in Shanghai is bold, but in

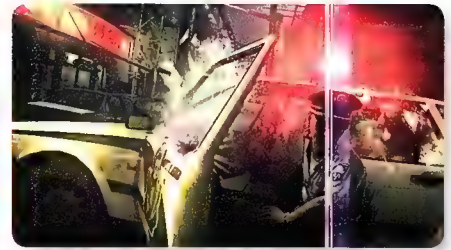
terms of level design and variety, it pays off huge dividends. From slick neon streets of the city's ghettos, to the sprawling freeways that link it to the rest of China, it looks wonderful. And as lawless places go, Shanghai is pretty up there, despite a rich veneer of modern success.

And, as Tom Stratton, the game's Associate Producer, said when we asked why the move, "It's the only place where someone like Lynch makes sense. He can be in the open there and no one cares."

So, yeah - reason to never visit Shanghai No. 247.

That's the setting and story side, but the gameplay is, to be brutally honest, still reminding us a lot of the original. A lot of the combat seems entirely arbitrary - either the game's hitboxes expand and contract randomly to add 'challenge', or there's something seriously wrong at IO Interactive - which would be odd, given the second Hitman game is still one of our all-time favourites. Similarly, while sometimes all it takes





to drop a mook is a round to the gut, you can at other times empty a clip into someone's shiny noggin and they'll just grin and blow you away with a Skorpion.

It certainly didn't help that our preview time was spent on a PS3 - and we *hates* the PS3 controller, precious!

On the other hand, Dog Days introduces some nice new touches. Cover works really well, and when you get shot now you crawl along until you can find yourself in cover, and then get up into it. There's a lot more destruction

possible with the environment, too, though this isn't overdone. That bank heist feel from Heat is still there, too, and if IO can firm up the game's ballistics, we'll be excited.

Gang-fight!

Technically speaking, Kane & Lynch's multiplayer has always been tied to the legacy of its single-player - it's well thought out and clever, but also glaringly problematic in terms of actual accuracy and any real sense of immersion.

There's a co-op mode, which sees you taking

on the task of beating the single player game with a mate, plus the usual heist-based games that either call for nerves of steel as you and a mess of other robbers go after the big score, or call for... well, nerves of steel as you and a mess of other robbers go after the big score (but with an undercover cop along for the ride!).

They are fun, and still unique in gaming. But also need far, far better hit mechanics.

As was said often during our hands-on time, we were looking at alpha-level code, so hopefully a lot more polish will see this excellent story and intriguing characters finally matched up with a game worthy of them. Until that happens, we'll be waiting patiently. **DH**



PC, PS3, Xbox 360 (previewed on PS3)

Developer IO Interactive

Publisher Namco Bandai

Website www.kaneandlynch.com



Gritty story, unique characters, Shanghai.



Poor hit mechanics.



Anticipation rating
Please, IO Interactive,
make this one good!

71%

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Star Trek Online, three months later

We were quietly confident that this MMO had some legs... are we still playing it?

It's now more than three months since Star Trek Online's launch; it's had time to settle down, time for the devs to fix a few bugs, and introduce some new content. But the first few months of any MMO are vital – this is the period when seemingly passionate players get bored, log off, and cancel subscriptions. Despite the fact that we're still playing, is there still life in the game?

Changing styles

At launch, many reviewers felt that STO was really two games pushed together, and that the ground-based portions of the game didn't really work with the space-based portions. The truth is even more complex, thanks to STO's levelling.

Most MMOs follow a basic levelling style: you move through PvE missions to get XP, and make occasional forays into PvP for random yucks or gear. But in STO, you can effectively ignore that progression, and get XP from just PvP.

This is a good thing, because while we are still playing, we're pretty bored with PvE missions. The lack of depth or mission types beyond 'Kill X of Y' makes getting through the PvE campaign super bland. Even WoW mixes up the early levels with interesting boss fights (ah, Hogger...), mission types and race-specific starting areas. STO doesn't even have FedEx quests, and in our first 20 levels we only performed one escort quest (which had no badguys)! Otherwise, every mission is based around killing Orion pirates, Gorn raiders... or even clouds of gas. Yawn.

All through our first ten or so levels we did a lot of co-op stuff, though. The random sector encounters, and even the more epic Fleet Action, delivered a much more compelling experience. But even then, fighting against STO's AI wasn't really delivering, and while we were still getting XP, we weren't really getting the thrills.

Killing people for fun

Like in any MMO, we like to dabble in PvP. Killing real people is just so much more challenging – and rewarding – than random bots. And in STO, you can level by doing it!

We hadn't really worked out the implications of this in our early play, but right now PvP is pretty much dominating our play time. Even losing at a PvP match nets you some XP, so you can literally sit around in any map just getting nailed by decloaking Klingons and level up. Amazing!

Thankfully, though, STO's PvP is just about the most compelling we've ever experienced. Playing a fantasy game like LotR Online always had a certain level of disconnect to it. We don't remember spam, DPS or tanking ever really coming up in the original book, but in a sci-fi setting, the standard classes and abilities of any MMO really seem to make sense – a real surprise, considering we weren't expecting that at all.

Plus, when you get a strong team working together, PvP is superb. Cruiser captains use their better energy reserves to outlast any opponent while providing damage crews and shield energy to more nimble Escort vessels, who in turn deliver some serious damage. All the while, Science captains can scan for targets, unleash some nasty rifts and all kinds of canon-inspired craziness. Plus the differences between the Klingon and Fed factions makes for some truly challenging fights.

Of course, when you get a terrible team – one who ignores your directives to stick together, to avoid full impulse because it drains power from weapons and shields, or to not attack a Klingon battlegroup one at a time... it sucks.

The interesting thing is that the PvP matches tend to go pretty fast; one side usually gets the upper hand early on, and then dominates. You

can also queue from anywhere in the game world, so there's no reason not to be working on a Fleet Action, like the Crystalline Entity, and still enter a PvP map whenever one fills up.


USS Cock-knuckle

Of course, while we are still having fun, the fact remains that the busy spacelanes of the game's launch have emptied somewhat. You literally couldn't keep up with the chat channel at launch, but now it's glacial, at least during our admittedly off-peak playing times.

But, honestly, we don't mind that. The dickhead quotient has also dropped significantly, leaving more dedicated players behind to really enjoy it – call me a purist, but it sucks when every second player you see is named either 'Commander Shephard' or 'Captain Jizzpants'.

Though, we will admit a certain admiration for the 'USS Covered in BEES!', ably commanded by 'Captain Eddie Izzard'.

It's hard to really judge the long-term health of STO, though. By this stage, Cryptic's previous effort – Champions Online – was pretty much dead in the water. STO is looking like the kind of game you can easily walk away from for a bit and then happily come back to, however. The influx of MMO newcomers are certainly learning the ropes, and we're seeing a lot more requests for group assistance in chat, while at the same time the devs are regularly adding more content and game options. We're still not really liking the single starting area for Fed players (boy does it make levelling new characters tedious!), and there's every chance we're going to ignore most of the game in favour of PvP – at least until we find a Fleet (the game's version of Guilds) to join.

For now, it looks like Captain William T. Grant has a long career ahead of him.  DH



Power to the PC: Brisbane

We came, we saw, it was awesome - all the action and pics from Atomic's latest Brisbane visit.

Well, the final leg of Atomic's Power to the PC Tour has come and gone, and we've said goodbye to the show in style. On a stormy night in Brisbane we have over 200 Atomicans show up at QUT's Garden Theatre - they walked away informed, entertained, well-fed and with a few beers in their bellies.

The doors to the Tour opened at four in the afternoon, but keen Atomicans were already braving the rain and waiting outside - we just had to let them into someplace dry! They found waiting for them displays from Gigabyte, Kingston and Samsung, an Alienware LAN from QUT's own games lab, and an auditorium waiting to be filled.

Once everyone had filed in and taken their seats, we kicked off. Atomic's Editor, David Hollingworth took the stage to thank QUT and to introduce the first of the speakers - QUT's own Dr Peta Wyeth.

Dr Wyeth gave a run down not only of what QUT had to offer those seeking a career in games development, but also outlined the growing focus that gaming will get at the campus, including a whole new set of buildings and labs that she's sure will see some great work in the future. She also made us a little jealous, because she's going to GDC and we're not. Poo.



Happy Atomicans waiting to enter the auditorium, and the Editor (and lovely assistant!) giving out some goodies.



The next speaker was Kingston's Vaughan Nankivell, who took the room full of rapt Atomicans through Kingston's memory products. He covered everything from top-end performance RAM to Kingston's range of SSDs - and he had an awesome video demo of a 24GB HyperX kit running a literal craptonne of virtual machines. Here's a link, and it's well worth watching.

Second cab off the rank was Billy Lin, from Gigabyte. He had a very Atomic presentation that covered in great detail the entire breadth of what their motherboards have to offer, including an hilarious video that showed off the advantages of USB3.0 - to surmise, if you want to impress and influence the gender of your choice, Gigabyte and USB3.0 is the way to go.

Our final speaker was Eddie Jung from Samsung, who had already entertained half of Melbourne with his subtle allusions to 3D porn on that leg of the tour. He didn't disappoint in Brisbane, either, and Samsung's presentation was a wonderful way to end the informative part of the show.

Then, it was time for free stuff!

The biggest prize was 3D monitor rig from Samsung, including a 22in LCD display and glasses from Nvidia. The lucky winner - Tim Yeowart, who will now be watching all the 3D 'adult material' he can stomach. There was more though, including a 6GB kit of HyperX RAM from Kingston and a P55 motherboard from Gigabyte, all won by happy - if somewhat shy at times - Atomicans.




Big thanks to Dominos for delivering a mighty amount of pizza to the gig!

We also had t-shirts and games to give out. The games were Hunter's Edition copies of Aliens Vs Predator courtesy of Sega (who also provided the game for QUT's LAN setup), and the t-shirts... well, we love causing a bit of chaos, so this was a free-for-all. Nothing like chucking free stuff at an auditorium full of people to get a things moving along.

But that's thirsty work, so it was time to retire to the display area for pizza eating (and HUGE thanks to Dominos for supplying 90 (!!!) pizzas), beer drinking, hardware drooling (as usual, Samsung's 3D monitor setup drew a crowd, and the presence of TeamAU overclocker Dino on the Gigabyte stand was very neat), and gaming.

In all, it was a perfectly Atomic night, and the BrisAtomicans are a truly awesome crowd to hang out with and share a brew. Thanks again, QUT, for hosting the night, thanks to Samsung, Kingston and Gigabyte for supporting us, and Sega for helping us frag a few Xenomorphs.

And thanks to everyone who came along and made the night so great. We will most definitely return!  DH



The 3DO Age

Is there room in the console space for total revolution? Ben Mansill recalls a time when such a thing was thought possible.

The console wars are always fought within a defined battlespace, according to rules of engagement defined by the market. What has happened before will happen again. In 1994 though, a brief, wonderful time, the natural order of things had a sideways attractor. Tucked in between Sega and Nintendo, in the months before Sony, there was 3DO.

Everything looked right for the challenger. 3DO wasn't just another competitor, it was a vision. A promise of great change in the very foundations of gaming. At the lead was Trip Hawkins, a master of the sexy promise and generator of mighty excitement. Founder of Electronic Arts, Hawkins rightly commanded immense respect. He split from EA, then announced the Big New Thing that would Change Everything. He was a handsome Yank in a black skivvy and a big positive smile. He was even more Steve Jobs than Steve Jobs himself is now.

An open-platform game console? Crazy! 3DO was a specification for a console and its software, designed by the 3DO Company and open to any company to manufacture the machine, or develop games. The 3DO company would take a tiny royalty from each console and game sold. A mere sliver, in a model almost identical to Philips and the CD.

The openness even extended to a total lack of copy protection. These guys were serious!

The hardware was truly a generational leap over the existing 16-bit SNES and Megadrive. Sporting not just a new fangled CD instead of chunky carts, but dual graphics processors that could spit out 3D of such quality and detail as had never been seen before. The CPU was a 32-bit RISC design made by ARM, the audio an unmatched 16-bit at 44.1kHz with support for Dolby Surround. Pretty damn cool and everything to love.

Leadup to launch saw Trip Hawkins do what he did so well - marketing, or more accurately: evangelising. 3DO was salvation. Revolution. It would shake up the industry by freeing developers from the shackles of multiple versions of a game, and the higher royalty rates demanded by Sega and Nintendo. It meant not needing approval by anyone for a game design. It would open the doors to let indies in for the first time on console. Standardised architecture was needed then as much as it is now.

The openness even extended to a total lack of region lockouts or copy protection. These guys were serious about freedom!



3DO was Time magazine's Product of the Year in 1994. Sega's Saturn was at least a year away, and Sony's PlayStation was still months from release. 1994 belonged to 3DO, and with it, a jump start in a console cycle with hardware performance that turned out to be at least equal to the upcoming generation.

Panasonic released the first 3DO machine,

3DO was a games machine a generational leap ahead of its competitors, and quite clearly the original promise was abundantly fulfilled.

In Australia it went onsale in 1994 at \$745. 3DO had also raised the bar for pricing in a big way. The now-familiar justification was used that it was a media box, not just a pure games machine. A photo slideshow and music player (with the first ever pattern visualiser on a console) apparently validated this claim. Saturn followed at \$799 and PlayStation the following year at \$699, so as it turned out, 3DO was in the zone for pricing.

It was a completely different story in the US, where it ultimately mattered. There a 3DO was US\$700, with Saturn at US\$400 and PlayStation US\$300. The entire 3DO open model had one fatal Achilles Heel: the companies that made its hardware needed to make a profit. Sega, Sony and Nintendo did not. Wearing a loss on the console and making it up in software didn't work in the open model where every participant had to make a buck, with the resultant price gap an unfixable problem.

The machine stumbled through a slow retreat until 1996, when a much-too-late price drop failed to hold back the PlayStation tidal wave. Trip's 3DO Company finally surrendered, becoming a games developer for multiplatform releases until 2003.

The 3DO continued to reward its gamers for many years. Over 200 games were eventually released.

The calls for an open-platform console continue today, and thanks to 3DO, we've been there and seen that it doesn't always work. Maybe one day we can learn from it and do it right - but that day is a while off yet. 🎮

and remained by far the producer of the most units. Sanyo and Goldstar (before they got Lucky) followed. Logitech produced the initial controllers (which daisy chained together for multiplay, there being just one controller port on the machine). Creative even released a 3DO-on-a-card for the PC - presumably for people that had a PC but no TV. In Japan, Panasonic even released a machine with a 5-disc CD drive - all this new open-platform stuff was Darwinising up some seriously innovative stuff!

The initial games were mostly awesome. Seeing real 3D done fast on a console was a revelation. Racing games were among the first to dazzle, with Crash 'n' Burn a good choice as the first bundled title, joined by the first Need for Speed, which was so good it spawned the mega series, and easily the best version of Road Rash, which as a multi-platform release helped provide a nice real world benchmark showing off the 3DO's immense capabilities. Terms like 'hyper-realistic' were often used, (Trip spoke fluent hyperbolic marketing-speak), and there was no doubt the

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